Top Turn 16″ Wood Lathe
(Model 46-860)

INSTRUCTION MANUAL

DATED 7-28-95

PART NO. 1346955

DELTA

TABLE OF CONTENTS

SAFETY RULES

Woodworking can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possiblity of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result. Safety equipment such as guards, push sticks, hold-downs, featherboards, goggles, dust masks and hearing protection can reduce your potential for injury. But even the best guard won't make up for poor judgment, carelessness or inattention. Always use common sense and exercise caution in the workshop. If a procedure feels dangerous, don't try it. Figure out an alternative procedure that feels safer. REMEMBER: Your personal safety is your responsibility.

This machine was designed for certain applications only. Delta Machinery strongly recommends that this machine not be modified and/or used for any application other than that for which it was designed. If you have any questions relative to a particular application, DO NOT use the machine until you have first contacted Delta to determine if it can or should be performed on the product.

DELTA INTERNATIONAL MACHINERY CORP.
MANAGER OF TECHNICAL SERVICES
246 ALPHA DRIVE
PITTSBURGH, PENNSYLVANIA 15238
(IN CANADA: 644 IMPERIAL ROAD, GUELPH, ONTARIO N1H 6M7)

WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

1. **WARNING: DO NOT** operate your lathe until it is completely assembled and installed according to the instruction manual.

2. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE TOOL.** Learn the tool's application and limitations as well as the specific hazards peculiar to it.

3. **IF YOU ARE NOT** thoroughly familiar with the operation of wood lathes, obtain advice from your supervisor, instructor, or other qualified person.

4. **KEEP GUARDS IN PLACE** and in working order.

5. **ALWAYS WEAR EYE PROTECTION AND SAFETY GLASSES.** Wear safety glasses (must comply with ANSI 287.1). Everyday eyeglasses have impact resistant lenses; they are not safety glasses. Also use face or dust mask if operation is dusty.

6. **MAKE SURE** wiring codes and recommended electrical connections are followed and that the machine is properly grounded.

7. **REMOVE ADJUSTING KEYS AND WRENCHES.** Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it "ON."

8. **WEAR PROPER APPAREL.** No loose clothing, gloves, neckties, rings, bracelets, or other jewelry to get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair.

9. **KEEP WORK AREA CLEAN.** Cluttered areas invite accidents.

10. **DON'T USE IN DANGEROUS ENVIRONMENT.** Don't use woodworking machinery in damp or wet locations, or expose them to rain. Keep work area well-lighted.

11. **KEEP CHILDREN AND VISITORS AWAY**. All children and visitors should be kept a safe distance from work area.

12. **DON'T FORCE TOOL.** It will do the job better and be safer at the rate for which it was designed.

13. **USE RIGHT TOOL.** Don't force tool or attachment to do a job for which it was not designed.

14. **DON'T OVERREACH.** Keep proper footing and balance at all times.

15. **MAINTAIN TOOLS IN TOP CONDITION.** Keep tools sharp and clean for best and safest performance.

16. **MAKE SURE** the tool rest height is adjusted properly.

17. **KEEP** tool rest as close to the work as possible.

18. **NEVER** adjust tool rest while work is turning.

19. **REMOVE** the tool rest before sanding or polishing.

20. **EXAMINE** set-up carefully before turning on the power.

21. **ROTATE** the workpiece by hand to check clearance before engaging power.

22. **WHEN TURNING** between centers **MAKE SURE** the tailstock center is snug against the workpiece and locked. Tailstock center should be lubricated if it is not a ball bearing center.

23. **MAKE SURE** screw fasteners do not interfere with the turning tool at the finished dimension of the workpiece when faceplate turning.

24. **EXAMINE** workpiece for flaws and test glue joints before placing workpiece in lathe.

25. **WHEN** roughing off, **DO NOT** jam tool into workpiece or take too big a cut.

26. **CHECK AND SELECT** proper speed for turning lathe "ON."

27. **NEVER** drive wood into drive center when it is in headstock. Set drive center into wood with a soft mallet prior to installing it in the lathe.

28. **NEVER** loosen tailstock spindle while work is turning.

29. **WHEN** faceplate turning, be sure material is securely fastened to the faceplate and that appropriate size faceplate is used to properly support workpiece.

30. **ROUGH CUT** workpiece as close as possible to finished shape before installing on faceplate.

31. **MAKE CERTAIN** indexing mechanism is disengaged before operating the lathe.

32. **TIGHTEN** all clamp handles before operating.

33. **USE** lowest speed when starting a new workpiece.

34. **DISCONNECT** lathe from power source when making repairs.

35. **DISCONNECT** lathe from power source and clean the machine before leaving it.

36. **MAKE SURE** the work area is cleaned before leaving the machine.

37. **SHOULD** any part of your lathe be missing, damaged or fail in any way, or any electrical component fail to perform properly, shut off switch and remove plug from the power supply outlet. Replace missing, damaged or failed parts before resuming operation.

38. **CAUTION:** To reduce the risk of injury, **ALWAYS** wear safety glasses and face and head protection when operating wood lathe.

39. **ADDITIONAL INFORMATION** regarding the safe and proper operation of this product is available from the National Safety Council, 1121 Spring Lake Drive, Itasca, IL 60143-3201 in the Accident Prevention Manual for Industrial Operations and also in the Safety Data Sheets provided by the NSC. Please also refer to the American National Standards Institute ANSI 01.1 Safety Requirements for Woodworking Machines and the U.S. Department of Labor OSHA 1910.213 Regulations.

UNPACKING AND CLEANING

1. Your machine is shipped complete in two containers. One container contains the lathe and the other container contains the safety shield. The following instructions pertain to the lathe only. Instructions for the safety shield are included in the safety shield container. Carefully remove the shipping crate from around the machine. Remove the protective coating from the machined surfaces of the lathe and all loose items. This protective coating may be removed with a soft cloth moistened with kerosene (do not use acetone, gasoline or lacquer thinner for this purpose). Figures 2, 3 and 4 illustrate all the items supplied with your lathe.

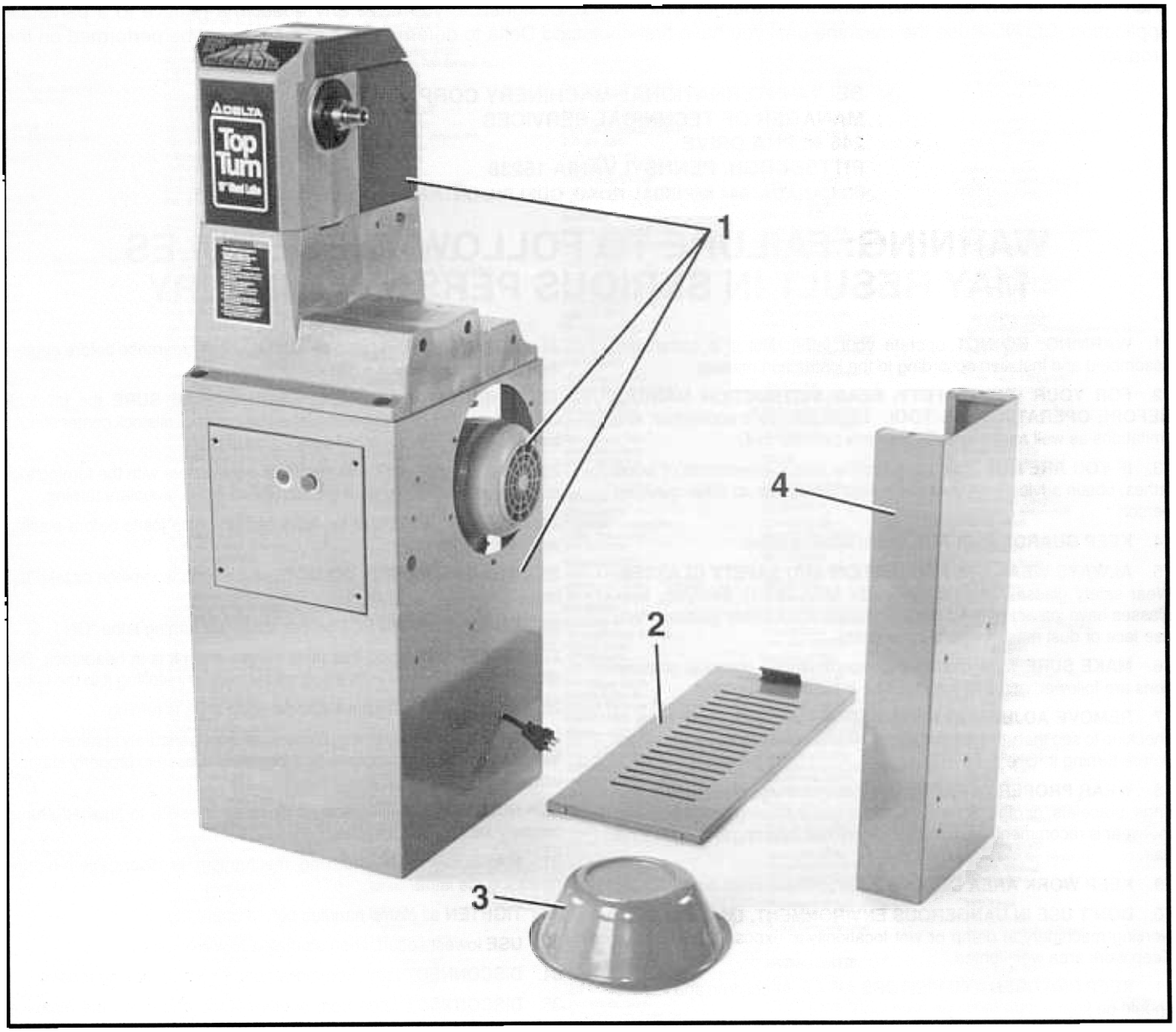


Fig. 2

Figure 2

1 - Headstock, motor and stand assembly

2 - Rear door for headstock cabinet

3 - Motor cover

4 - Tailstock base

Figure 3

5 - Shelf between headstock and tailstock base

6 - Lathe bed sections (2)

7 - Foot for tailstock base

8 - 80mm long hex head screws (4) - for connecting lathe beds to each other and to headstock

9 - Special centering washers (4) - for connecting lathe beds to each other and to headstock

10 - 30mm long hex head screws (4) - for mounting foot to bottom of lathe bed

11 - M8.4 flat washers (4) - for mounting foot to bottom of lathe bed

12 - 30mm long hex head screws (2) - for mounting foot to tailstock base

13 - M10 flat washers (2) - for mounting foot to tailstock base

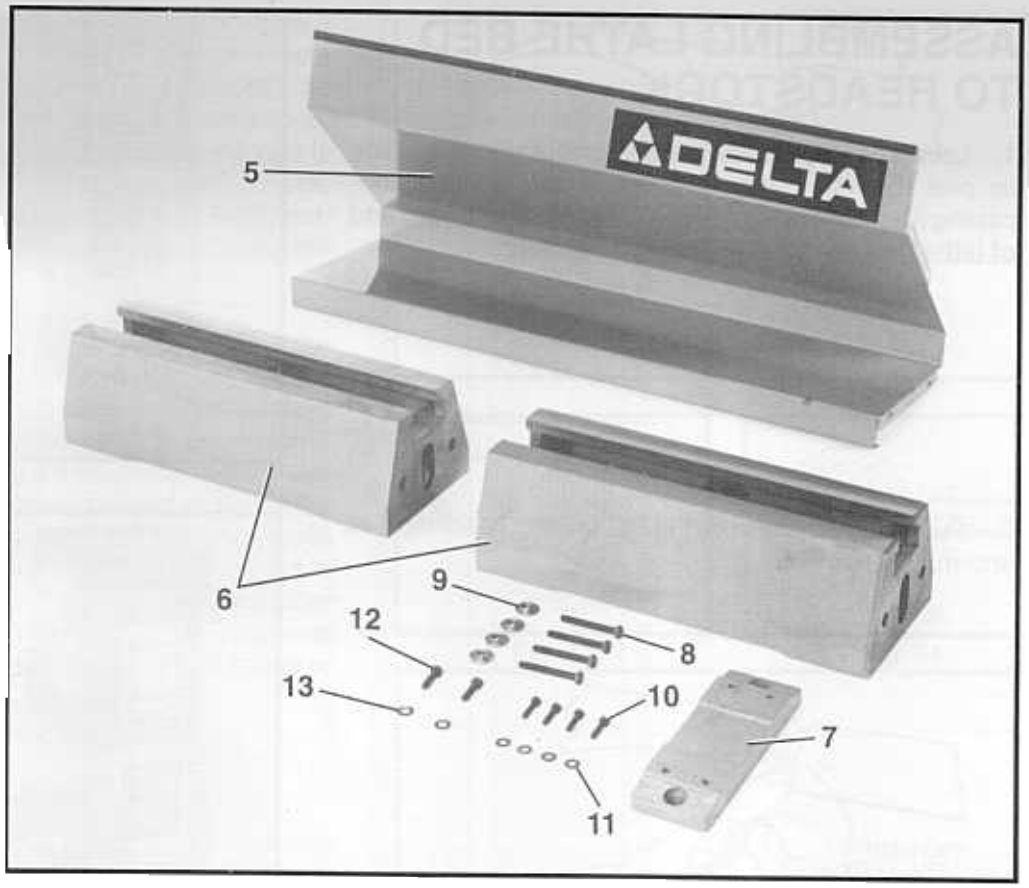


Fig. 3

Figure 4

14 - Tailstock

15 - Tool rest base

16 - Spindle wrenches (2)

17 - 12mm long screws (8) - for assembling shelf to headstock and tailstock

18 - 6″ Tool rest

19 - 12″ Tool rest

20 - Spur center

21 - Ejector for tailstock ball bearing center

22 - Tailstock ball bearing center

23 - Knock-out bar

24 - Headstock handwheel

25 - Special spacer - needed on spindle when mounting some faceplates that do not have sufficient threading capacity on the hub

26 - 3″ Faceplate

27 - 6″ Faceplate

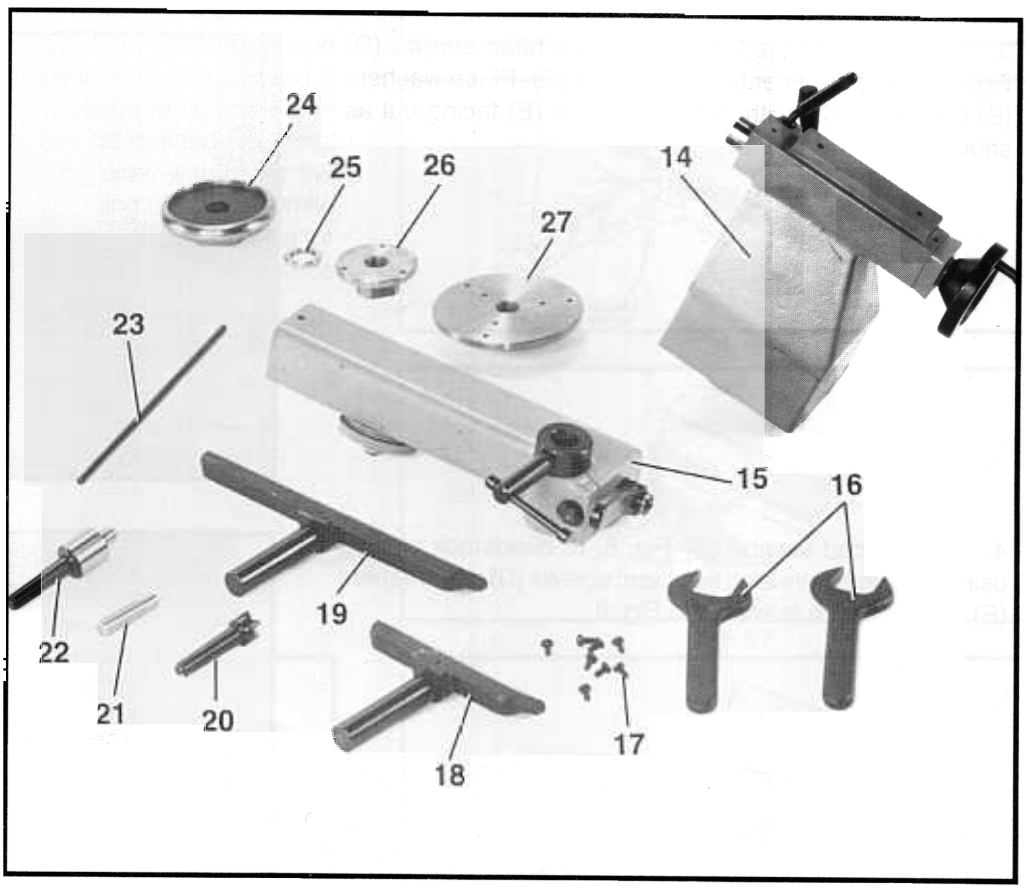


Fig. 4

ASSEMBLING LATHE BED TO HEADSTOCK

1. Locate one of the lathe bed sections (A) Fig. 5, and line up pins (B) with matching holes on side of headstock casting (C) as shown. **WARNING: Support outboard end of lathe bed section (A) during assembly**.

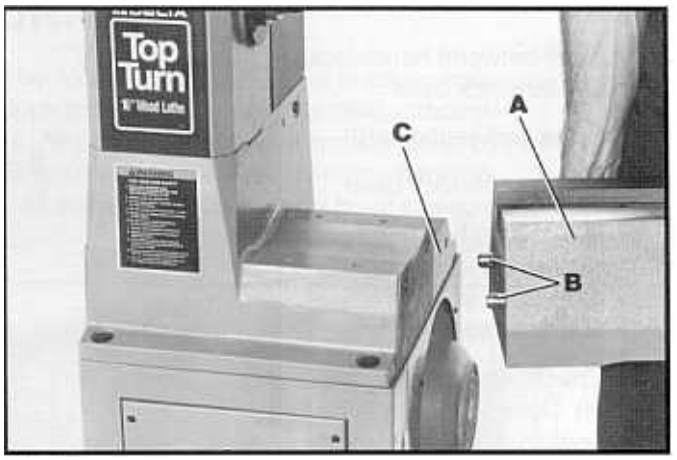


Fig. 5

2. Push bed section (A) Fig. 6, toward headstock as shown.

Fig. 6

3. Locate two of the 80mm long hex head screws (D) Fig. 7, and special centering washers (E). Place washers (E) on screws (D) with hub of washers (E) facing out as shown.

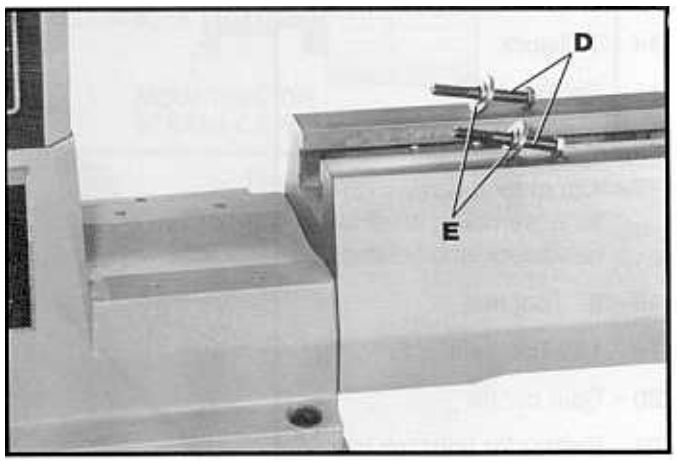


Fig. 7

4. Fasten bed section (A) Fig. 8, to headstock casting using the two 80mm long hex head screws (D) and washers (E), one of which is shown in Fig. 8.

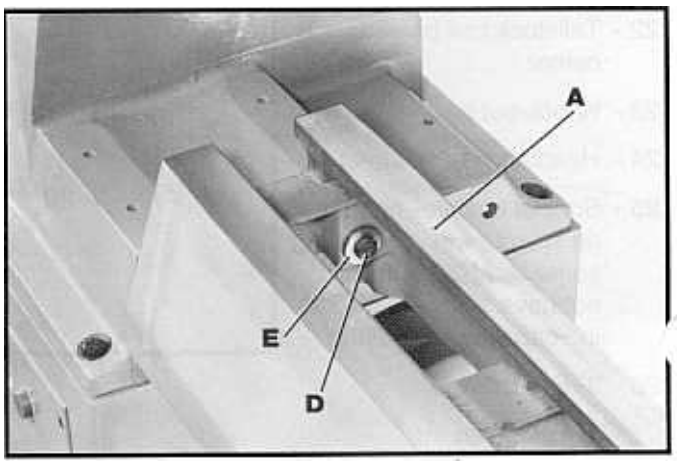


Fig. 8

5. Assemble remaining lathe bed section (F) Fig. 9, to bed section (A) in the same manner. **WARNING: A suitable support such as a roller stand (G) must be used to support bed section (F) during assembly, as shown.**

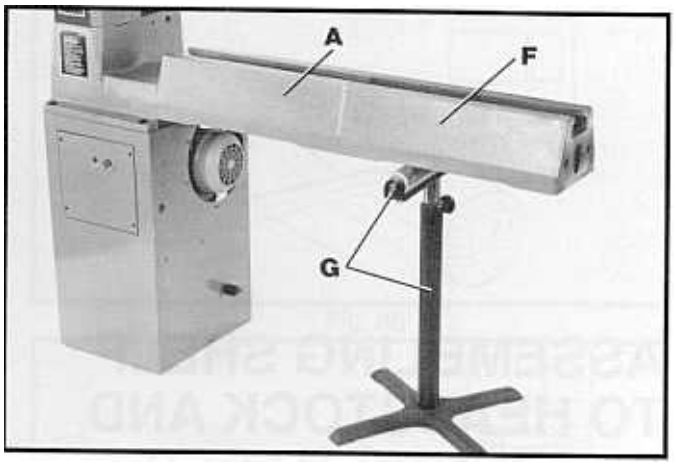


Fig. 9

ASSEMBLING TAILSTOCK BASE TO LATHE BED

1. Fasten foot casting (H) Fig. 10, to bottom of lathe bed section (F) using the four 30mm long hex head screws (J) and flat washers (K). Hex head screws (J) are inserted up through the four holes (L) in casting (H) and threaded into the four threaded holes located underneath lathe bed section (F). Note that roller stand (G) is supporting bed section (F).

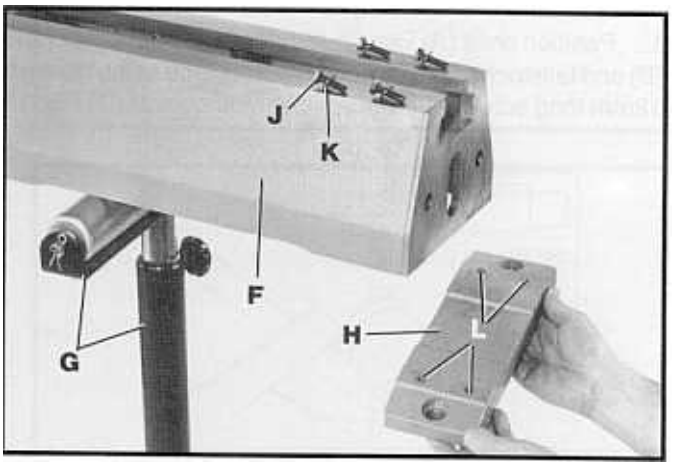


Fig. 10

2. Fig. 11, illustrates the foot casting (H) assembled to bottom of bed section (F).

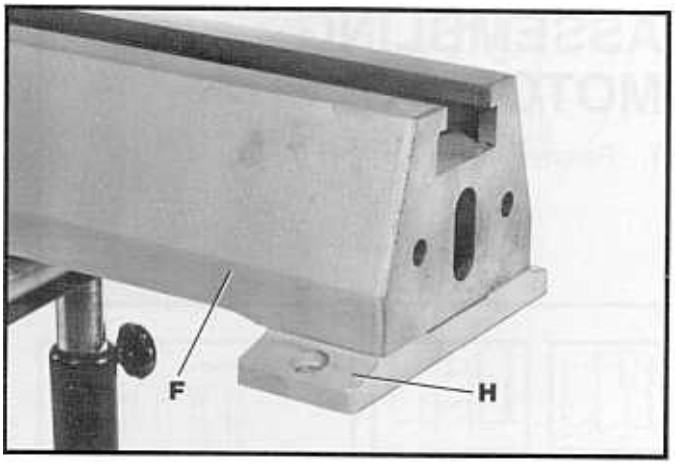


Fig. 11

3. Position tailstock base (O) Fig. 12, underneath foot casting (H) and fasten tailstock base (O) to foot casting (H) using the two 30mm long hex head screws and flat washers, one of which is shown at (P).

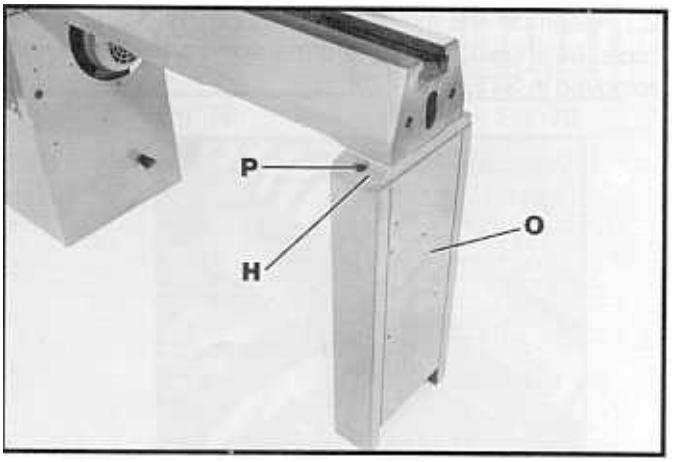


Fig. 12

ASSEMBLING SHELF TO HEADSTOCK AND TAILSTOCK BASES

1. Position shelf (A) Fig. 13, between the headstock base (B) and tailstock base (C) and fasten in place using the eight 12mm long screws, four of which are shown at (D) Fig. 14.

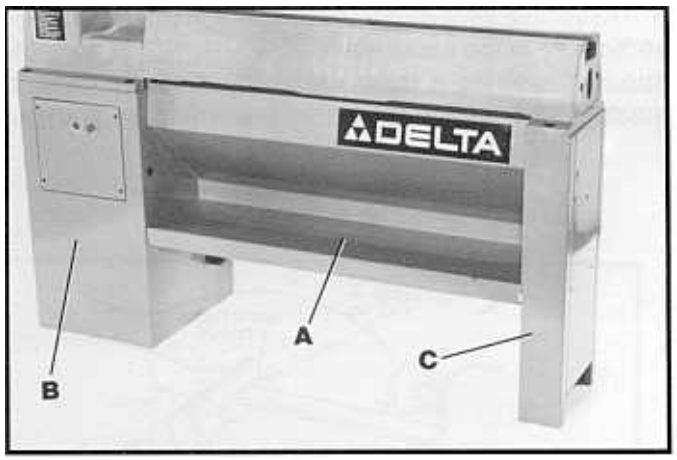


Fig. 13

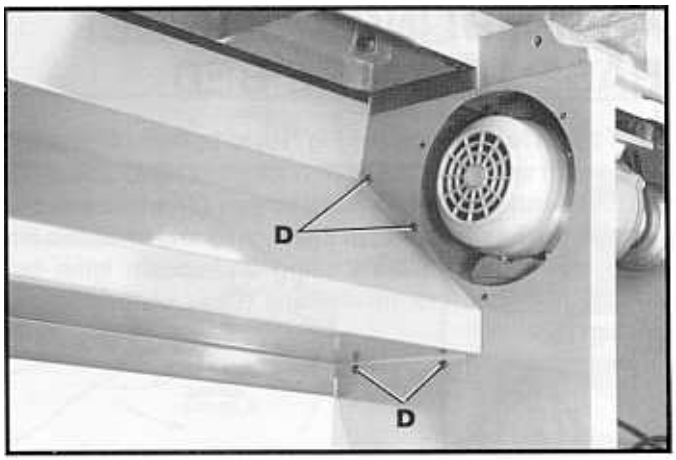


Fig. 14

ASSEMBLING MOTOR COVER

1. Remove the three screws (A) Fig. 15.

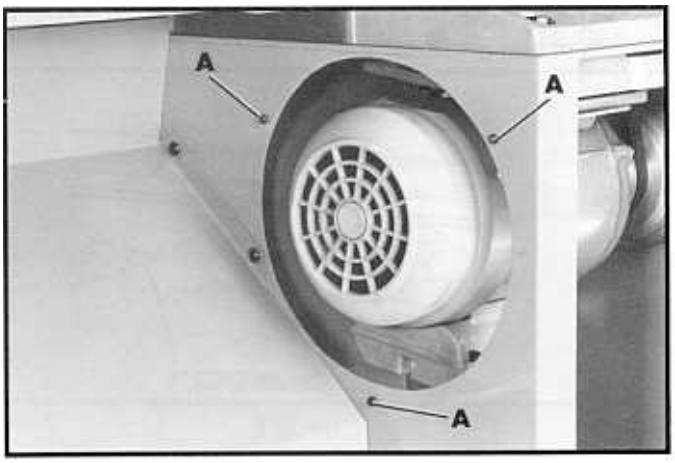


Fig. 15

2. Assemble the motor cover (B) Fig. 16, to headstock base, as shown, using the three screws (A) which were removed in STEP 1.

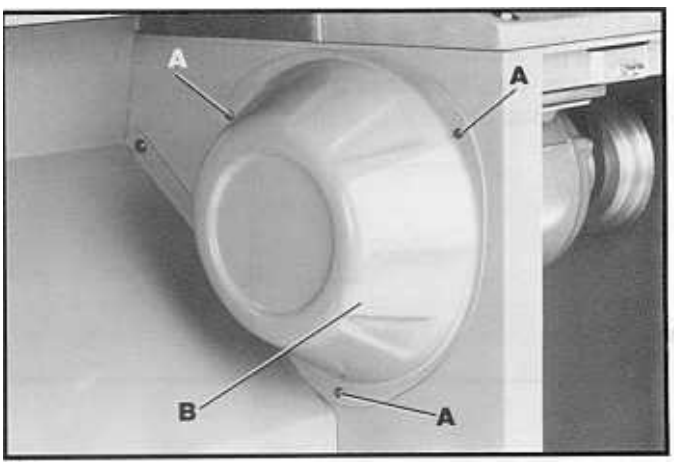


Fig. 16

ASSEMBLING REAR DOOR TO HEADSTOCK

IMPORTANT: Before assembling the rear door to the headstock, remove all packing material around the motor and inside the headstock cabinet. Also adjust belt tension by referring to the instructions "BELT POSITIONING, TENSION AND SPEED CONTROL on pages 14 and 15 of this manual.

1. Insert the two pins (A) Fig. 17, located on bottom of door (B) into the two holes on bottom of headstock base (C) and assemble rear door (B) as shown in Fig. 18.

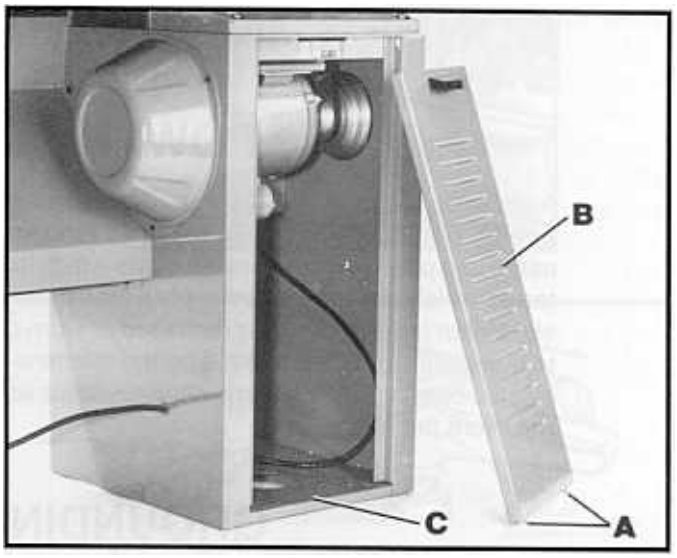


Fig. 17

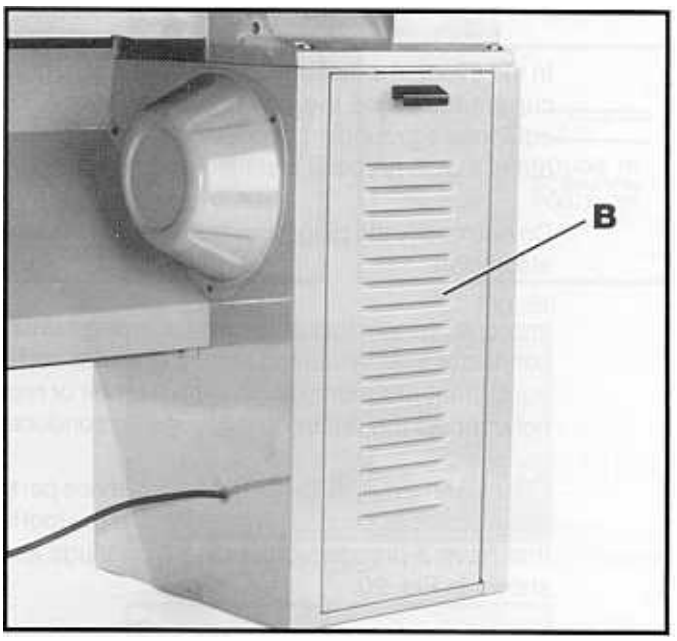


Fig. 18

HEADSTOCK HANDWHEEL

A headstock handwheel (A) Fig. 19, is supplied with your lathe and is to be threaded onto the outboard headstock spindle as shown.

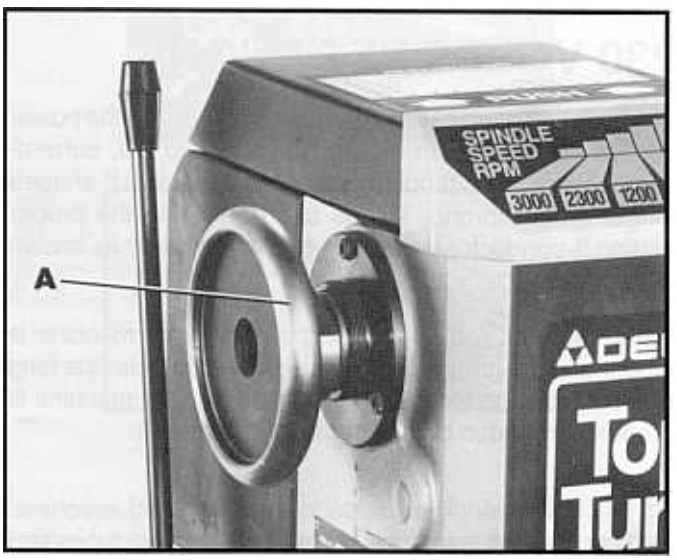


Fig. 19

CONNECTING LATHE TO POWER SOURCE

POWER CONNECTIONS

A separate electrical circuit should be used for your machine. This circuit should not be less than #12 wire and should be protected with a 15 Amp time lag fuse or circuit breaker. If an extension cord is used, use only 3-wire extension cords which have 3-prong grounding type plugs and 3-pole receptacles which accept the tool's plug. For distances up to 150 feet use #10 wire. Have a certified electrician replace or repair damaged or worn cord immediately. Before connecting the power cord to the electrical outlet, make sure the machine switch is in the "OFF" position and be sure that the electric current is of the same characteristics as the motor. Running on voltage other than specified will injure the motor.

GROUNDING INSTRUCTIONS

CAUTION: THIS TOOL MUST BE GROUNDED WHILE IN USE TO PROTECT THE OPERATOR FROM ELECTRIC SHOCK.

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Do not modify the plug provided - if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment grounding conductor to a live terminal.

Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded. Use only 3-wire extension cords that have 3-pronged grounding type plugs and 3-hole receptacles that accept the tool's plug, as shown in Fig. 20.

Repair or replace damaged or worn cord immediately.

230 VOLT OPERATION

The motor on your machine is wired for 230 volts; the power cord is equipped with a plug that has two flat, current-carrying prongs in tandem, and one round or "U" shaped longer ground prong. This is used only with the proper mating 3-conductor grounding type receptacle, as shown in Fig. 20

When the 230 Volt three prong plug on your machine is plugged into a grounded 3-conductor receptacle, the long ground prong on the plug contacts first so the machine is properly grounded before electricity reaches it.

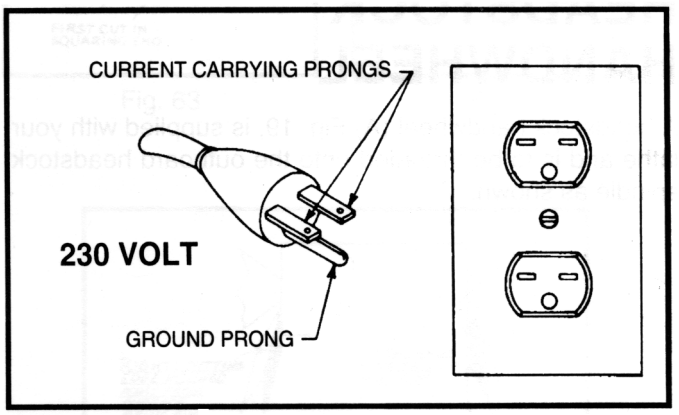


Fig. 20

WARNING: MAKE CERTAIN THE RECEPTACLE IN QUESTION IS PROPERLY GROUNDED. IF YOU ARE NOT SURE, HAVE A CERTIFIED ELECTRICIAN CHECK THE RECEPTACLE.

ASSEMBLY AND OPERATION OF TOOL REST

1. Rotate clamp handle (A) Fig. 21, until clamp (B) is loose and slide clamp (B) into channel (C) of the lathe bed. To lock tool rest base in position on lathe bed, rotate clamp handle (A) to the right. **NOTE:** Adjustment to the clamping action of the tool rest can be made by tightening or loosening the nut located directly underneath clamp (B).

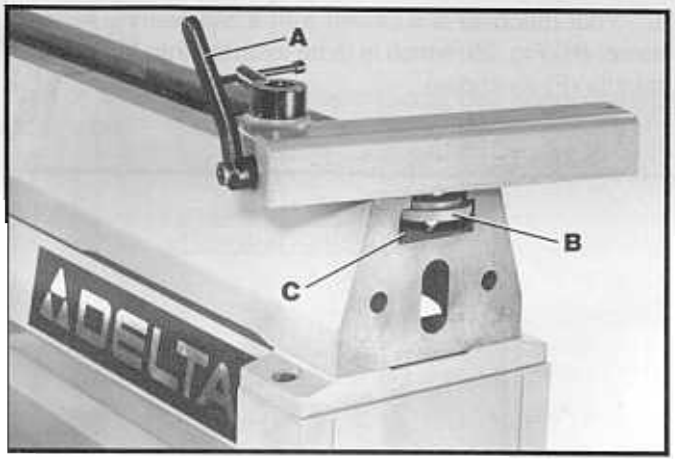


Fig. 21

2. Two tool rests, one 12″ long and one 6″ long are supplied with your lathe. Decide which one you wish to use and insert post (D) Fig. 22, of tool rest into holder as shown. Tighten lock lever (E) to hold tool rest in place.

3. To position the tool rest base on the lathe bed, lift up clamp handle (A) Fig. 22, move the tool rest base to the desired position and lock in place by pushing down on handle (A). **NOTE:** Clamp handle (A) can be repositioned by pulling out and rotating the handle. To adjust the tool rest (F) for the correct height, loosen locking lever (E), move tool rest (F) up or down and tighten locking lever (E).

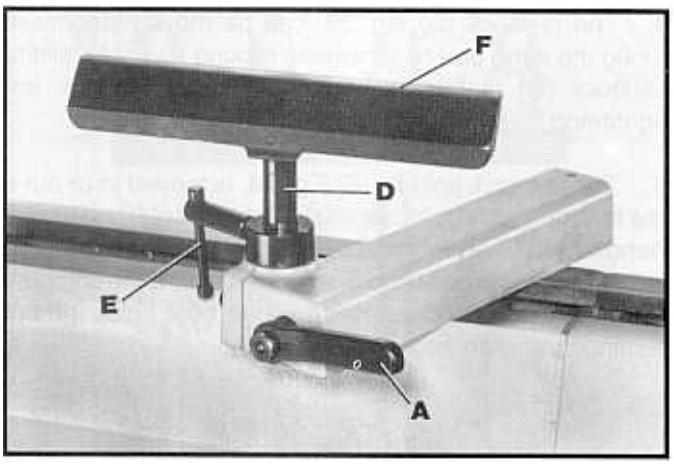


Fig. 22

ASSEMBLY AND OPERATION OF TAILSTOCK

1. Rotate clamp handle (A) Fig. 23, until clamp (B), is loose and slide clamp (B) into channel (C) of the lathe bed. To lock tailstock (D) in position on lathe bed, rotate clamp handle (A). **NOTE:** Adjustment to the clamping action of the tailstock can be made by tightening or loosening the nut located directly underneath clamp (B).

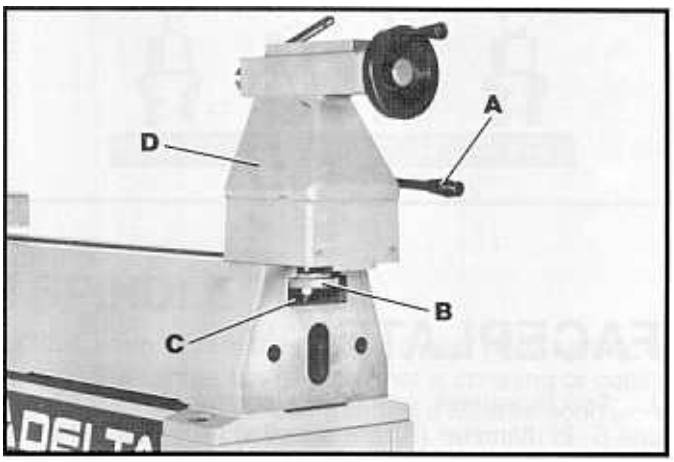


Fig. 23

2. Insert ejector (E) Fig. 24, into tailstock spindle (F) as shown. **NOTE:** The ejector (E) enables you to remove the tailstock center by unscrewing handwheel (G).

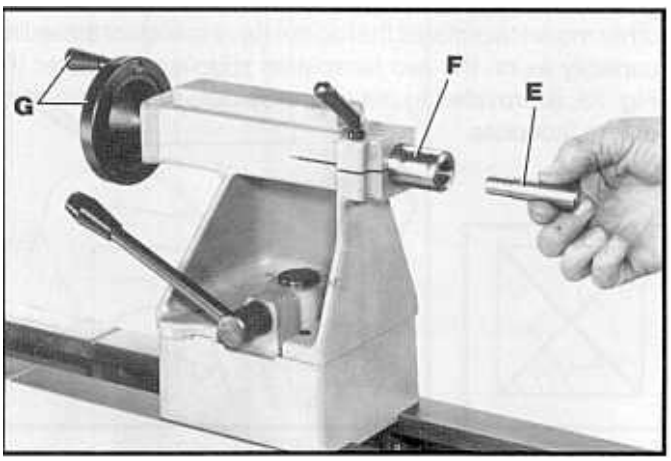


Fig. 24

3. Your machine is supplied with a ball bearing tailstock center (H) Fig. 25, which is to be inserted into the tailstock spindle (F) as shown.

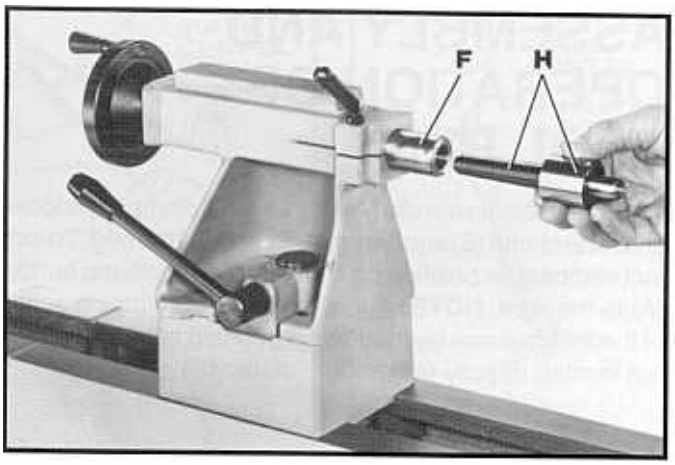


Fig. 25

4. The tailstock (D) Fig. 26, can be moved lengthwise along the lathe bed by loosening locking lever (A), sliding tailstock (D) to the desired position on the bed, and tightening lever (A).

5. The tailstock spindle (F) Fig. 26, is moved in or out of the tailstock body by loosening locking lever (J) and turning handwheel (G). Total movement of the tailstock spindle (F) is three inches. The tailstock spindle is hollow the complete legnth of the tailstock enabling you to bore holes through turnings using an auger.

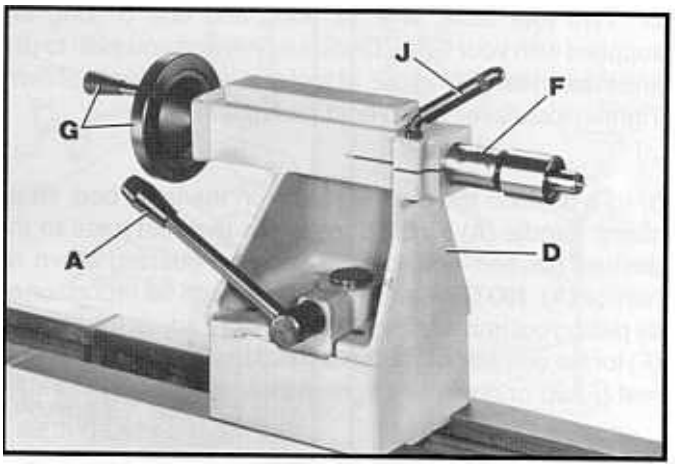


Fig. 26

FACEPLATES

1. Two faceplates, one 3″ in diameter (A) Fig. 27, and one 6″ in diameter (B) are supplied with your lathe and are to be threaded onto the spindle (C). Two wrenches (D) are supplied for installing or removing the faceplates. For other model faceplates that do not have sufficient threading capacity as on the two faceplates supplied, a spacer (D) Fig. 28, is provided to put on the spindle before threading on the faceplate.

Fig. 27

Fig. 28

2. Fig. 29 illustrates the 6″ diameter faceplate (B) threaded onto the inboard end of the headstock spindle.

Fig. 29

3. Faceplates can also be used on the outboard end of the headstock spindle, as shown at (B) Fig. 30.

Fig. 30

STARTING AND STOPPING THE LATHE

The start and stop buttons are conveniently located on the front of the headstock cabinet. To turn the lathe "ON" push the start button (A) Fig. 31, and to turn the lathe "OFF" push the large stop button (B).

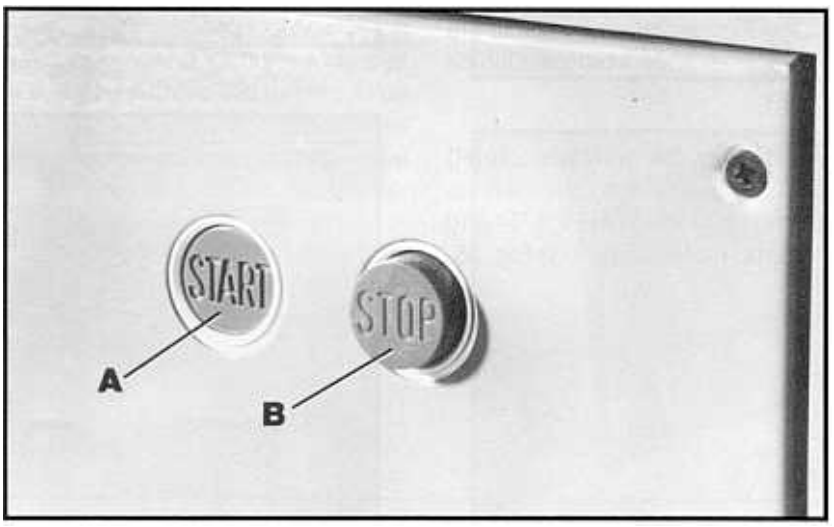


Fig. 31

BELT POSITIONING, TENSION AND SPEED CONTROL

Five spindle speeds of 350, 750, 1200, 2300 and 3000 RPM are available with your lathe. When the belt is on the largest step of the spindle pulley and the smallest step of the motor pulley, the spindle speed will be 350 RPM and when the belt is on the smallest step of the spindle pulley and the largest step of the motor pulley, the spindle speed will be 3000 RPM. A spindle speed RPM chart (A) Fig. 32, is conveniently provided on the headstock.

Fig. 32

The chart shown in Fig. 33, suggests spindle speeds for wood lathe turning.

DIAMETER OF WORK	ROUGHING OFF	GENERAL CUTTING	FINISHING
Under 2″ Dia.	900 to 1300 RPM	2400 to 2800 RPM	3000 to 4000 RPM
2″ to 4″ Dia.	600 to 1000 RPM	1800 to 2400 RPM	2400 to 3000 RPM
4″ to 6″ Dia.	600 to 800 RPM	1200 to 1800 RPM	1800 to 2400 RPM
6″ to 8″ Dia.	400 to 600 RPM	800 to 1200 RPM	1200 to 1800 RPM
8″ to 10″ Dia.	300 to 400 RPM	600 to 800 RPM	900 to 1200 RPM

Fig. 33

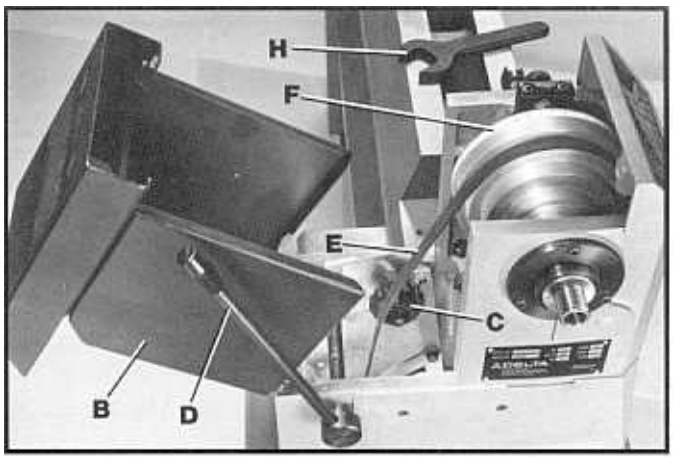


Fig. 34

To change speeds, proceed as follows:

Disconnect the lathe from the power source.

2. Open headstock cover (B) Fig. 34, by pushing it to the rear as shown. Also remove rear door from headstock cabinet.

3. Loosen hex head knob (C) Fig. 34, with wrench (H) supplied and push belt tension lever (D) to the rear as shown. This will release tension on the belt (E) Figs. 34 and 35, spindle pulley (F) Fig. 34 and motor pulley (G) Fig. 35.

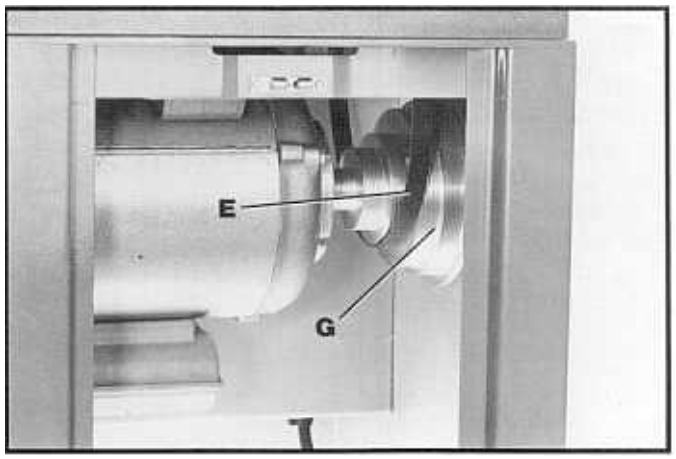


Fig. 35

4. Position belt (E) Figs. 36 and 37, on the desired steps of spindle pulley (F) Fig. 36 and motor pulley (G) Fig. 37. Pull belt tension lever (D) Fig. 36 toward the front of the headstock to apply tension on the belt. Tighten hex head knob (C) Fig. 36 with wrench (H) supplied, replace rear door on headstock cabinet and close headstock cover (B).

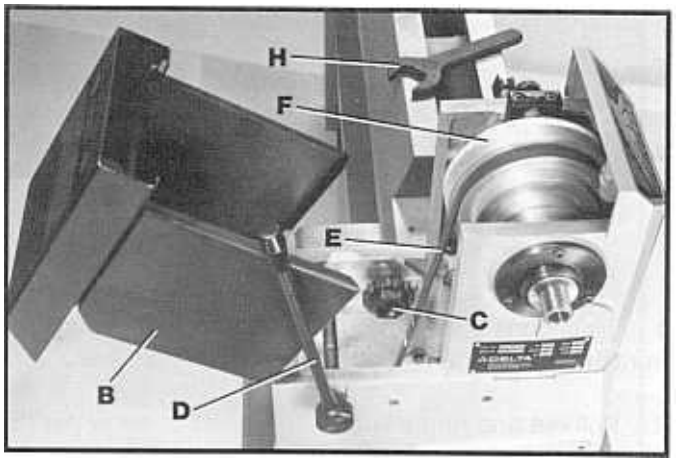


Fig. 36

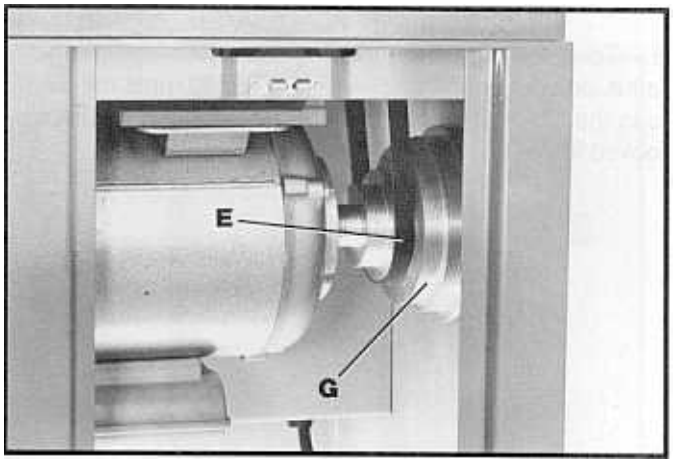


Fig. 37

INDEXING PIN

The spindle pulley (A) Fig. 38, has a row of 24 holes (B) accurately spaced around the rim of the pulley and are numbered 1 to 24 as shown. This feature makes it possible to make 2, 3, 4, 6, 8 or 12 evenly spaced divisions on turnings which could be fluted, grooved, or holes drilled at these points. For example, if you wanted the turning to be divided into three equal divisions you would index at holes 8, 16 and 24; if you wanted the turning divided into six equal divisions you would index at holes 4, 8, 12, 16, 20 and 24; and if you wanted eight equal divisions, index at holes 3, 6, 9, 12, 15, 18, 21 and 24. Follow the same procedure for dividing the turning into two, four or twelve equal divisions. An indexing chart (C) Fig. 39, is provided on the top cover of the headstock for your convenience.

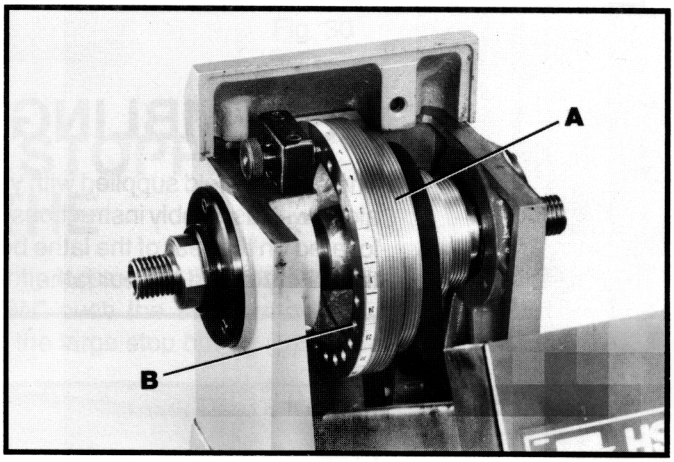


Fig. 38

Fig. 39

1. To engage the indexing pin, disconnect the machine from the power source and swing back head cover.

2. Pull out and rotate knob (D) Fig. 40, to allow pin (E) Fig. 41, to engage one of the desired indexing holes on the rim of the spindle pulley as shown.

3. To disengage the indexing pin when operating the lathe, pull out and rotate knob (D) Fig. 40, until roll pin (F) is in the horizontal position. The indexing pin will then be locked in the out position as shown.

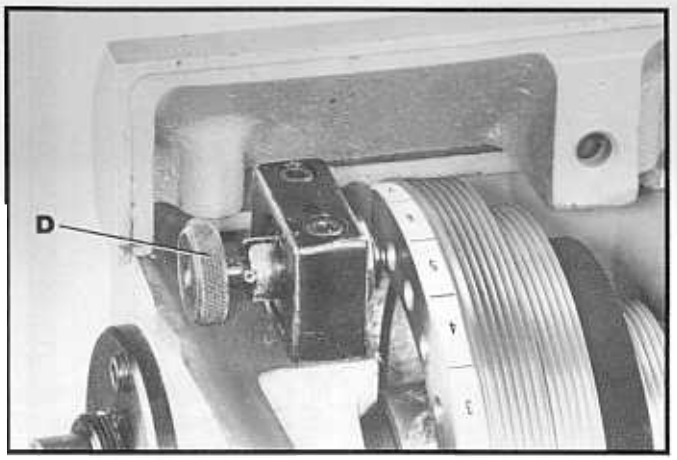


Fig. 40

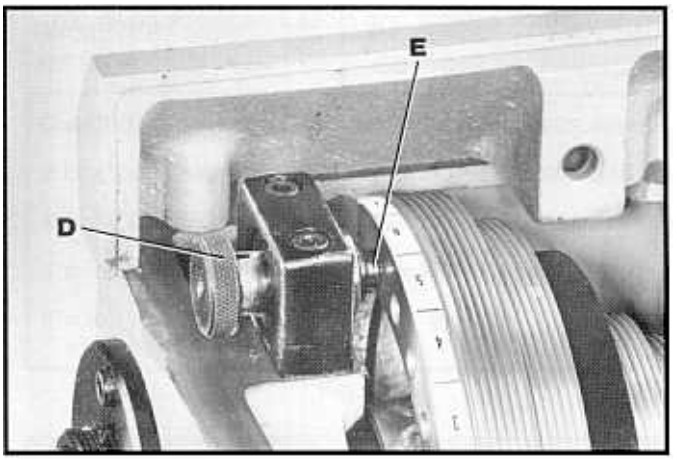


Fig. 41

ASSEMBLING SAFETY SHIELD

The safety shield supplied with your lathe is shipped in a separate carton along with assembly instructions for mounting to the four holes (A) Fig. 42, located on the rear of the lathe bed. Locate these instructions and mount the safety shield to your lathe.

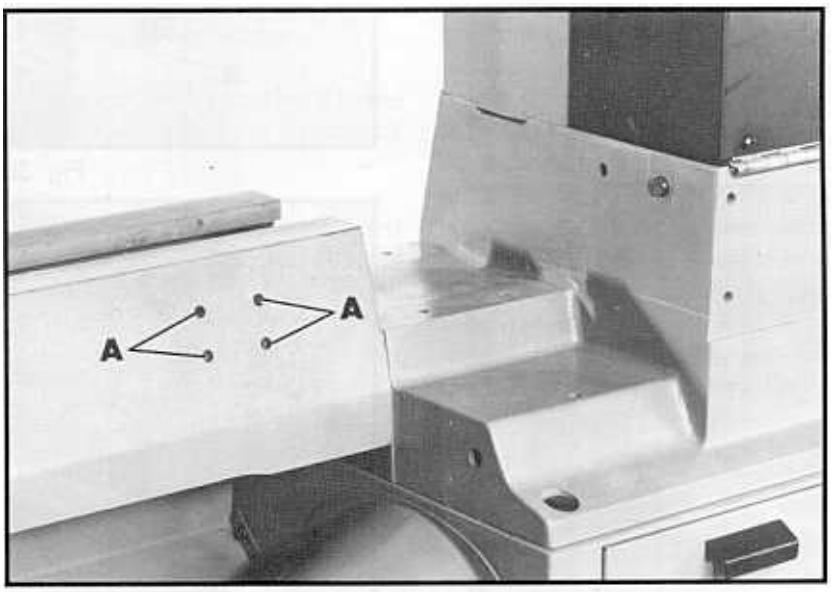


Fig. 42

OPERATION

The following directions will give the inexperienced operator a start on the common lathe operations. Use scrap material for practice to get the feel of the machine before attempting regular work.

LATHE TOOLS

The standard set of tools used in wood turning comprises five different shapes as shown in Fig. 43. Most important of these is the gouge, a roundnose, hollow chisel which is used for roughing cuts, cove cutting and other operations. Next in importance is the skew chisel, a double-ground, flat chisel, with the end ground to an angle instead of being square across. This tool is used for smoothing cylinders, for cutting shoulders, beads, vee-grooves, etc. The spear or diamond-point chisel and the round-nose chisel are scraping tools which are used where their shape fits the contour of the work. The parting tool is a double-ground chisel, and is used for cutting-off and for making straight incisions or sizing cuts to any required diameter.

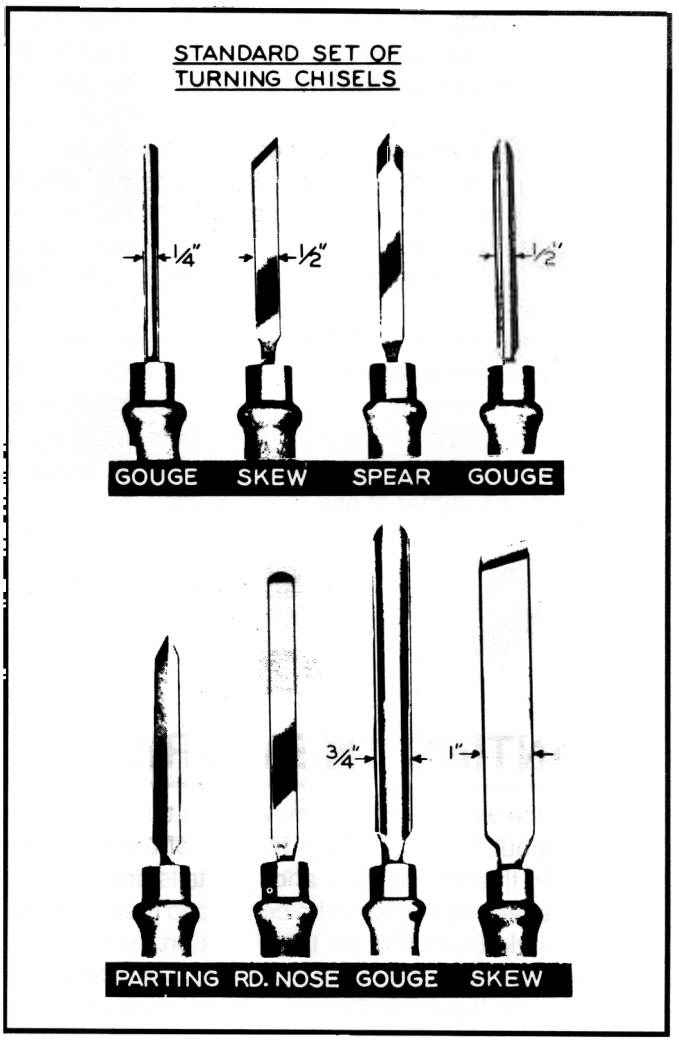


Fig. 43

HOW TO TURN SPINDLES

Any turning which is worked between lathe centers is called a spindle turning. This is the principal type of wood turning, as typified by chair and table legs, lamp stems, etc. The turning of spindles can be done with either a scraping or cutting technique, the cutting technique by virtue of faster wood removal and a cleaner surface being almost a must for good work.

CENTERING THE WORK

Wood stock for any spindle turning should be approximately square, and the ends should be square with the sides. Two common methods of determining the center are shown in Figs. 44 and 45. In Fig. 44, a distance a little more or a little less than one-half the width of the stock is set off from each of the four sides. The small square thus set off in the center can then be used in marking the true center. The diagonal method, Fig. 45, consists of drawing lines from corner to corner, the intersection marking the center of the work.

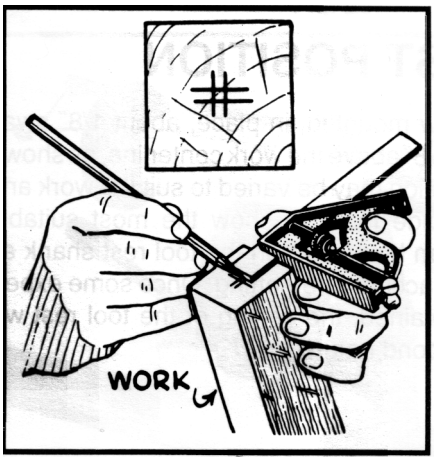


Fig. 44

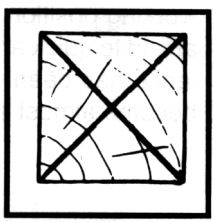


Fig. 45

After marking each end, the true center should be definitely marked with a punch awl or dividers, as shown in Fig. 46. If the stock is hardwood, the centers should be drilled to a depth of about 1/8″, as shown in Fig. 47. The spur or live center is then placed against one end of the work and seated by striking with a mallet, as shown in Fig. 48. In hardwood, it is advisable to make a starting seat for the spur center, this being done by sawing on the diagonal lines, as shown in Fig. 49, and drilling a small hole at the intersection. After driving the center, it is best to hold center and work together and fit immediately to headstock spindle. If you are not using a ball bearing center, the end of work at tailstock center should be oiled, placing the lubricant on the wood either before or after it is put in the lathe (see Fig. 50). Many turners use beeswax, tallow, or a wax-and-oil mixture as a lubricant. The ideal method is to use a ball bearing center, which eliminates lubricating entirely. If the work is to be removed from the lathe before completion, an index mark should be made as a guide for recentering, as shown in Fig. 51. A permanent indexer can be made by grinding off one corner of one of the spurs.

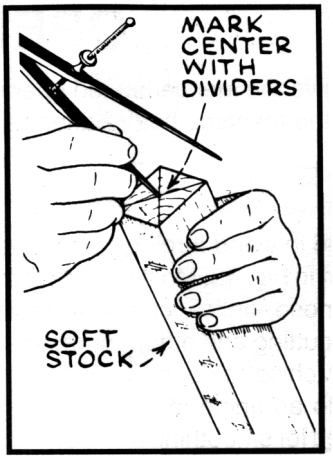


Fig. 46

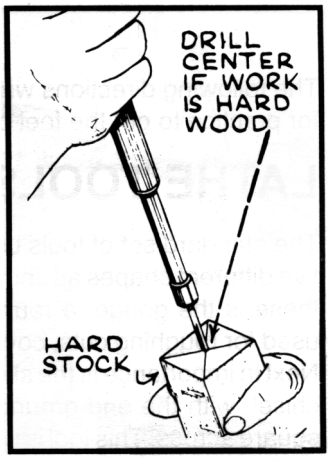


Fig. 47

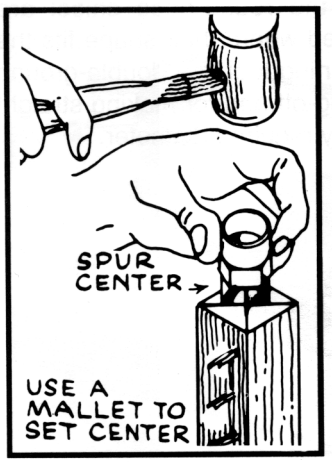


Fig. 48

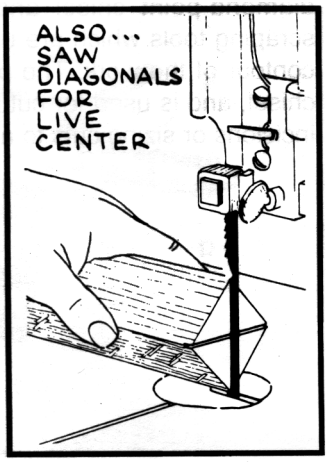


Fig. 49

MOUNTING THE WORK

Mounting the work is done by moving the tailstock up to a position about 1 or 1-1/2″ from the end of the stock, and locking it in this position. Advance the tailstock center by turning the feed handle until the center cup makes contact with the work. Do not support the work on the center pin alone. Always have the rim of the center cup imbedded at least 1/8″ into the work. Continue to advance the center while slowly rotating the work by hand. After it becomes difficult to turn the work, slack off on the feed about one-quarter turn and lock the tailstock spindle.

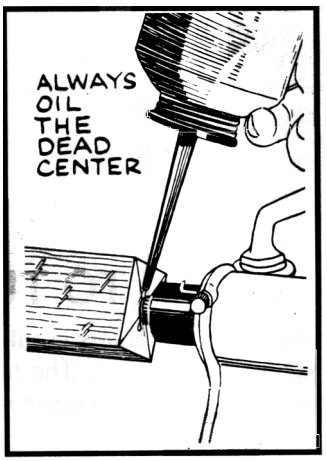


Fig. 50

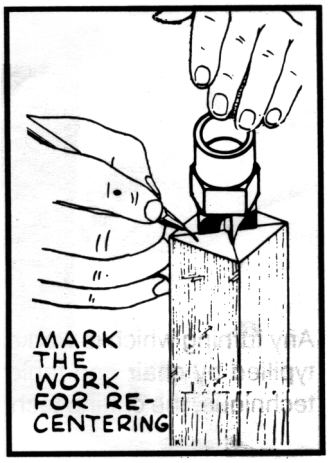


Fig. 51

TOOL REST POSITION

The tool rest is now mounted, in place, about 1/8″ away from the work and 1/8″ above the work centerline, as shown in Fig. 52. This position may be varied to suit the work and the operator. A guide mark to show the most suitable working position can be placed on the tool rest shank as an aid to quick and accurate re-setting. Once some experience has been obtained, the setting of the tool rest will become almost second nature.

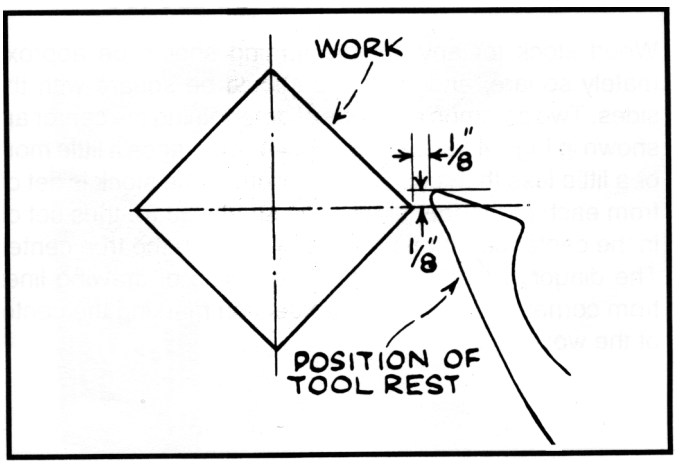


Fig. 52

ROUGHING A CYLINDER

The large gouge is used in the first turning operation of roughing-off the sharp corners of the work. Run the lathe at low speed and hold the gouge in the manner shown in Fig. 53. The cut starts about 2 inches from the tailstock end, and continues from this point towards and off the tailstock end. A second bite is then taken about 2" or 3" to the left of the first cut, advancing again towards the tailstock to merge with the cut previously made. The procedure continues until a point about 2" from the live center is reached where the gouge is rolled in the opposite direction to carry the final cut off the live center end of the work. The roughing cut should not be carried out with one continuous movement as this tends to tear long slivers from the corners of the work; neither should the cut be started directly at the end of the stock for the same reason. The cut can be safely carried from the center of the stock toward and off either end once the first roughing cut has been made.

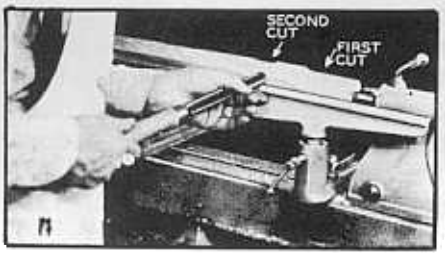


Fig. 53

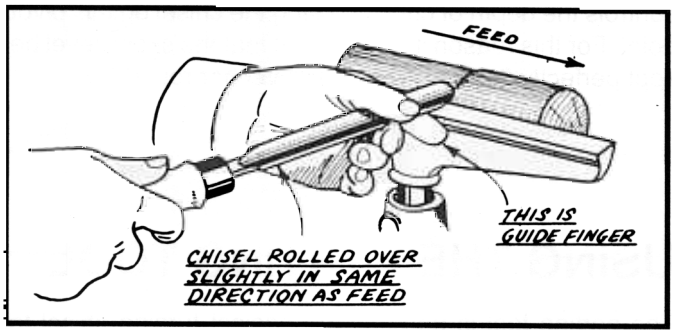


Fig. 54

The position of the gouge in relation to the work involves two or three important angles. First of all, the tool may be advanced along the work either from right to left or from left to right. From left to right or from headstock towards tailstock is preferable, since this throws the chips clear of the operator. The gouge is rolled over slightly in the same direction it is advancing, as shown in Fig. 54. The tool is held well up on the work, with the bevel or grind tangent to the revovling surface, as shown in Fig. 55. In this position it will make a clean, shearing cut. When pushed straight into the work, like Fig. 56, the gouge has a scraping action, which is normally poor practice in spindle turning. The roughing cut is continued until the work approaches 1/8" of the required diameter, stepping up to second or third speed once a barely cylindrical form has been obtained.

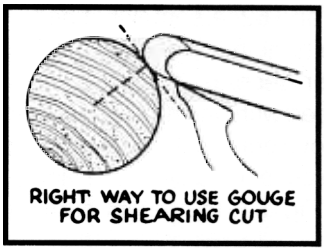


Fig. 55

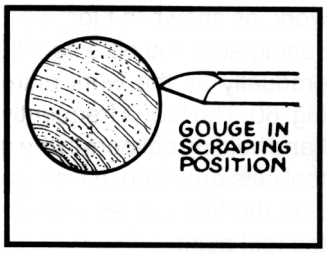


Fig. 56

POSITION OF HANDS

In all tool handling, the handle hand takes a natural position, being nearer or further from the end of chisel depending on the amount of leverage required. The position of the tool rest hand is more a matter of individual liking rather than any set or "proper" position. However, a palm-up grip, as illustrated with the gouge, is generally considered the best practice. In this position, the first finger acts a a guide, as shown in Fig. 57, sliding along the tool rest as the cut is made. The alternate position is a palm-down grip, which is shown in Fig. 58. In this position, the heel of the hand or the little finger serves as a guide. The palm-down position is solid and positive-excellent for roughing or heavy cutting. Most beginners start with the palm-down grip,switching later to the palm-up position for better manipulation of the chisel.

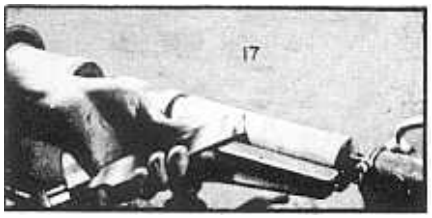


Fig. 57

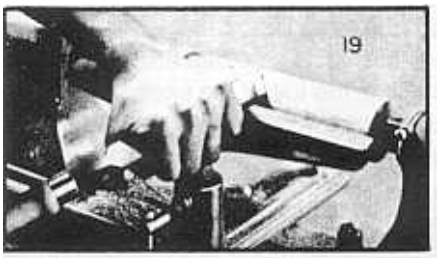


Fig. 58

SMOOTHING A CYLINDER

This operation is done with the large skew chisel. It demands a little practice, but should be mastered thoroughly because it is one of the most important cuts in turning. Figs. 57 and 58, show how the chisel is held, using either grip as desired. The cutting point is near the center of chisel and high on the work, as shown in Fig. 59. The chisel must be supported by the tool rest at all times - in striving for a certain position in relation to the work, the beginner often overlooks this all-important point. Beginners often use the method shown in Fig. 59 to locate the proper tool position. To do this, you place the skew well over the work and riding-flat against it.

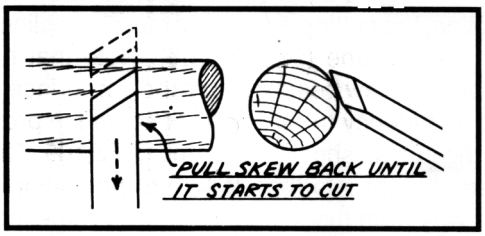


Fig. 59

Pulling back slowly on the tool will eventually put it into position where it will bite into the wood. Raising the handle increases the depth of cut; lowering the handle makes the cut less. As with the gouge, the skew can be advanced in either direction. The part of the skew which does the actual cutting is the center position and toward the heel. It is worthwhile to stop a test cut in progress and note just how the skew cuts. You will note that the back portion of the grind or bevel supports the tool, and the handle hand controls the depth of cut by rocking the chisel on this pivot point. For this reason it is important that the skew bevel be kept perfectly flat, not a double bevel nor rounded.

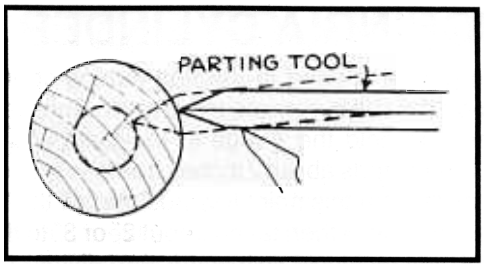


Fig. 60

USING THE PARTING TOOL

The parting tool is perhaps the easiest turning chisel to handle. It is a scraping tool, and is simply pushed into the work, as shown in Figs. 60, 61 and 62. A somewhat better cutting action is obtained if the handle is held low, raising gradually as the work diameter decreases, as shown in Fig. 60. The tool is frequently used with one hand, the other hand holding calipers in the groove being cut. When parting tool cuts are deep, a clearance cut should be made alongside the first cut, as shown in Fig. 61, to prevent burning the tool point.

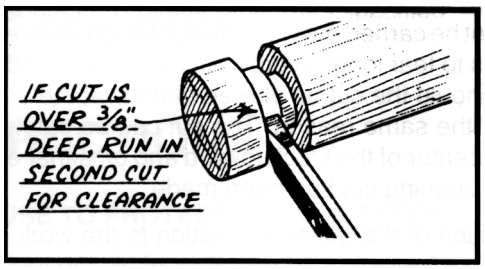


Fig. 61

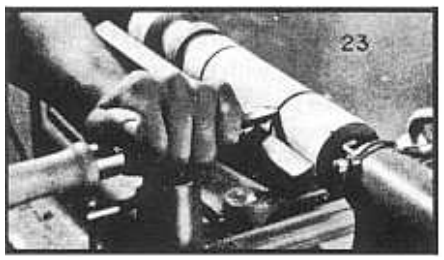


Fig. 62

SQUARING AN END

This operation can be done with a parting tool. However, the parting tool is a rough cutter, so that ultimately the skew must be used in cleaning the cut. The whole operation can be done with the skew, and this technique is illustrated by the drawings in Figs. 63, 64 and 65. The first movement is a nicking cut with the toe of the skew, as shown in Fig. 63. This cut cannot be made very deep without danger of burning the chisel, so a clearance cut is made by inclining the skew away from the first cut and again pushing the tool into the work. This procedure of side cut and clearance cut is continued as often as needed. The important point to note is that while the skew can be pushed into the wood in any direction, the cutting edge itself must be inclined a little away from this plane (see Fig. 65). Note that if the full cutting edge of skew bears against the cut surface, the tool will have a tendency to run. Now, observe the proper way to make the cut, as shown at left end of Fig. 65. The chisel is pushed straight into the work, but the cutting edge is inclined away from the cut surface - only the extreme toe cuts. This is the most important principle in skew handling, and you will run into it repeatedly in making shoulders, beads and vee cuts.

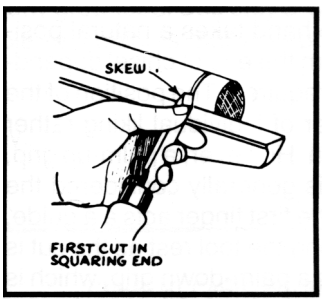


Fig. 63

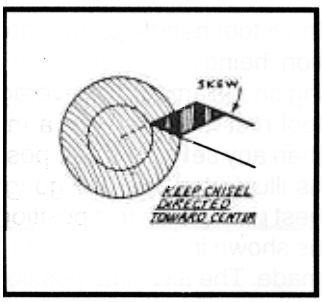


Fig. 64

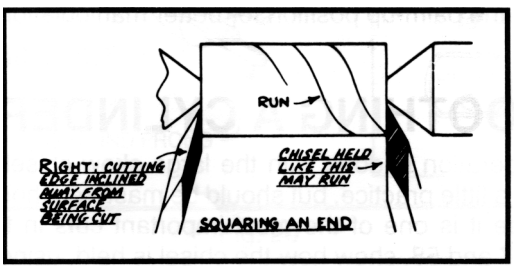


Fig. 65

CUTTING A SHOULDER

The parting tool is first used to reduce the wood to within 1/16″ of the required shoulder and diameter, as shown in Fig. 66. The waste stock is then cleaned out with the gouge, Fig. 67. Actual cutting of the shoulder is done with the skew, as shown in Fig. 68, and is a duplication of squaring an end. The horizontal cut is also made with the skew, but in a little different manner from that used in doing plain cylinder work. If the shoulder is long, the ordinary skew position can be used for the outer portion of the cut, but at the angle between the horizontal and vertical cuts, the heel of the chisel moves into a position tangent between the skew and the cylinder, as shown in Fig. 69. In this position, the handle of the chisel is raised slightly to allow it to cut as the tool moves along the rest. A very light cut should be taken in order to produce smooth work. The heel of the skew can be used for making the entire cut, if desired, but the cut, whether in this position or any other position, should not be picked up directly at the end of the stock. It is quite evident that any horizontal cut started directly from the end of the work will have a tendency to bite into the wood, often ruining the entire piece. Always run off the end and not into it. Where a very short shoulder makes this impossible, it is best to use the skew flat in a scraping position. If the cutting technique is used, engage only with the heel of skew in a very light cut.

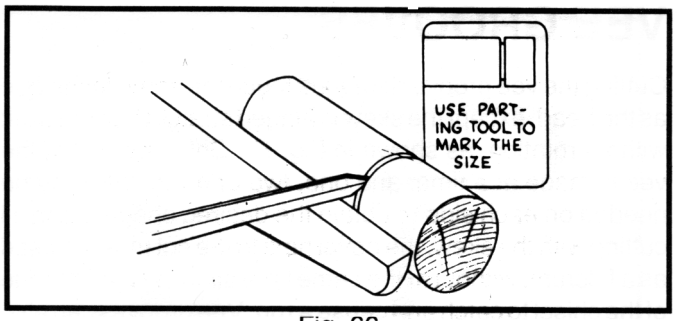


Fig. 66

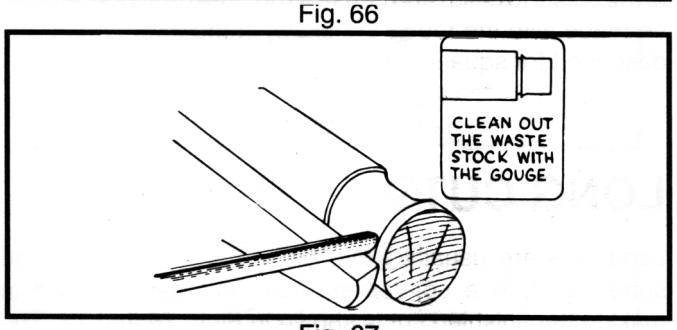


Fig. 67

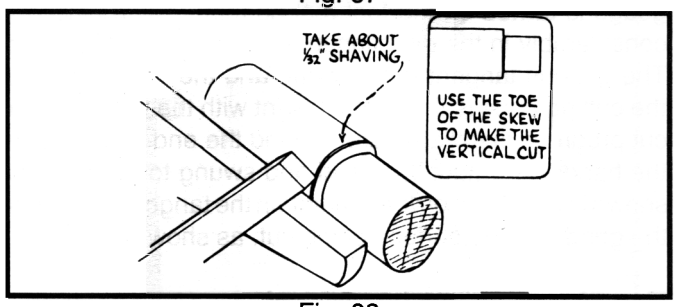


Fig. 68

CUTTING SMALL BEADS

Beads can be scraped or cut. The easy method of scraping is done with the spear chisel, and works to best advantage on beads separated by parting tool cuts, as shown in Fig. 70. Scraping is slower and less productive of clean work than cutting, but it has the advantage of perfect safety - you won't spoil the work with long gash runs.

Cutting beads quickly and accurately with the small skew is one of the most difficult lathe operations. Various working methods can be used, the usual system being as shown in Figs. 71, 72 and 73. The first cut is a vertical incision at the point where the two curved surfaces will eventually come together. This cut can be made with either heel or toe of skew, Fig. 74 showing the toe being used. Now, place the skew at right angles to the work and well up on the cylinder, as shown in Fig. 71. The chisel is flat on its side at the start, and is evenly rotated through the successive stages of the cut, as shown in Figs. 71, 72 and 73. At the same time, the chisel is pulled slightly backwards to maintain the cutting point. The entire cut is made with the heel of chisel. The opposite side of the bead is cut in the same manner, one cut serving to produce the full shape in each instance. Beads cut in this manner are beautifully smooth and polished, and the techique is well worth mastering.

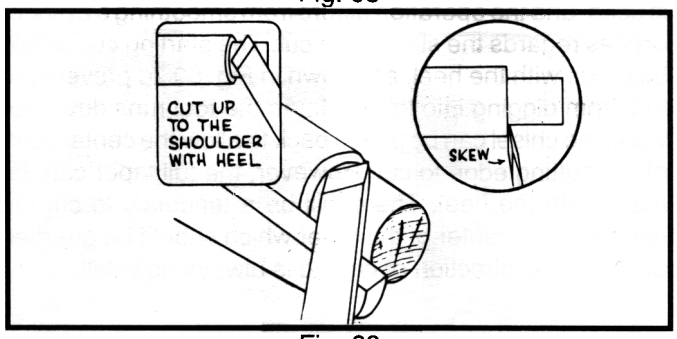


Fig. 69

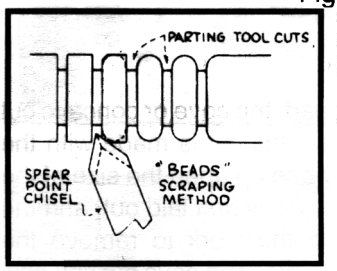


Fig. 70

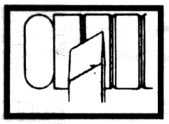


Fig. 71

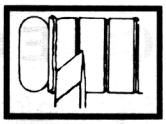


Fig. 72

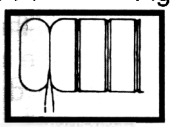


Fig. 73

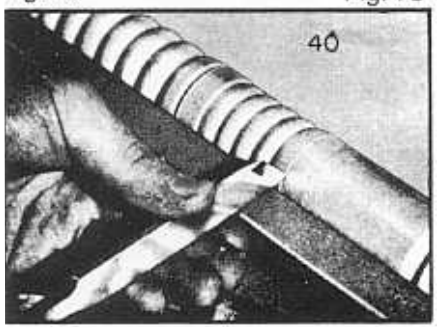


Fig. 74

VEE GROOVES

Cutting the vee groove demands much the same technique as the bead, except the skew is hinged straight into the work without rotation, as shown in Fig. 75. Only one-half of the vee is made at a time, and one, two or more cuts may be needed on each side to obtain the desired shape. As in all cutting with the skew, the bevel next to the cut must be used as a fulcrum, without at the same time allowing the full edge of the chisel to catch and cause a run. Vee grooves can also be made with the toe of the skew, in the manner already described for squaring an end.

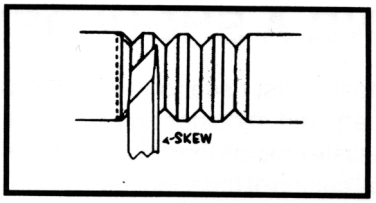


Fig. 75

LONG CUTS

Long cuts are usually either convex or straight-tapered surfaces. With a convex surface, the method used in making the finishing cut is shown in Figs. 76 and 77. The gouge is turned on the tool rest so that it will be inclined considerably in the direction in which it is about to move. The grind is tangent to the work, and the center point of the cutting edge is the contact point with the wood. As the cut progresses towards and around the end of the curve, the handle is gradually raised and swung to the right, as shown in Fig. 77, in order to maintain the tangency between the grind and the surface being cut, as shown in Fig. 78.

Figs. 79 and 80 show the cutting of a long taper. The skew is used, and the operation differs from smoothing a cylinder only as regards the start of the cut. The starting cut should be made with the heel, as shown in Fig. 80, to prevent the tool from digging into the work. As the tool runs down the work, the chisel can be pulled back to allow the center point of the cutting edge to cut. However, the full taper can be made with the heel. There will be a tendency to cut too deeply at the center of the taper which should be guarded against. The direction of cutting is always downhill.

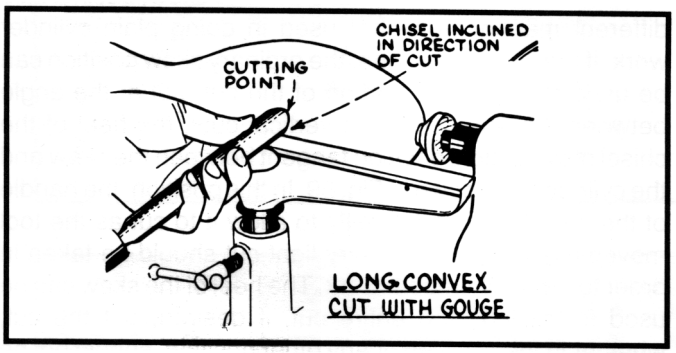


Fig. 76

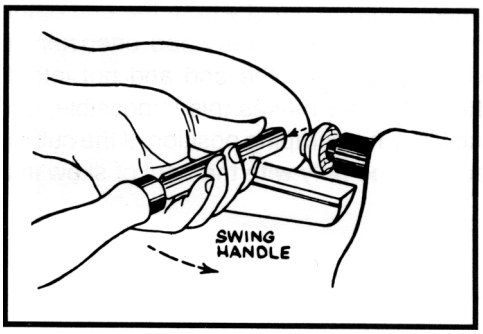


Fig. 77

Fig. 78

Fig. 79

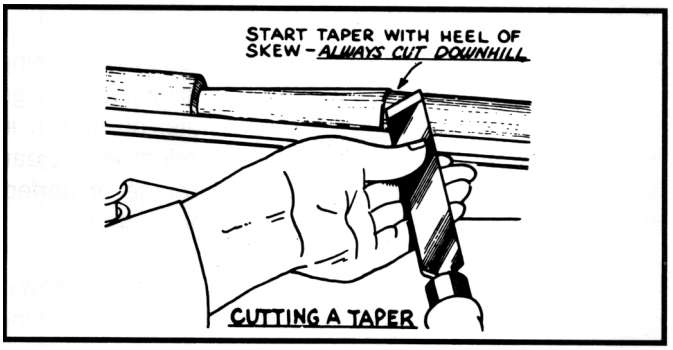


Fig. 80

COVE CUTS

Second to forming a perfect bead, the cove or concave cut is the most difficult to master. This cut is made with the gouge, the size of the tool depending upon the size of the cut. The size of the intended cove is first laid out, and the gouge is pushed directly into the work to remove the surplus stock, as pictured in Fig. 81. The cove cut can now be made.

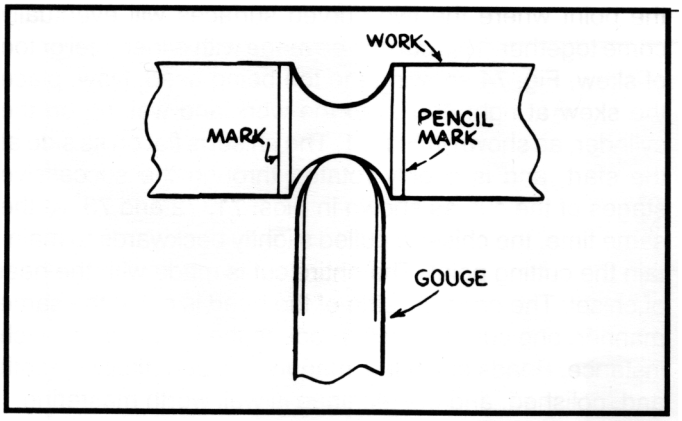


Fig. 81

The gouge is placed on edge on the tool rest in such a position that the grind of the chisel forms an approximate right angle with the work, as shown in Figs. 82 and 83. The chisel contacts the work at the center of the cutting edge, the tool being held so that the centerline of the gouge is pointing directly towards the center of the revolving stock, as shown in Fig. 84. This starting position is important; otherwise the gouge will have a tendency to run along the surface of the work.

From the starting position, the gouge is pushed into the revolving stock, and the tool is rolled on the rest. A triple action takes place here: First, the chisel is rolled to follow the shape of the cut; second, the handle is dropped slightly so that the portion already cut will force the lip of the chisel sideways; third, the chisel is pushed forward so that at the end of the cut, Fig. 85, it will be well up on the work and tangent with the cut surface. Only one-half of the cut is made at one time, then the chisel is reversed to cut the other half. The occasional turner is advised to make cove cuts with a scraping technique, using either the small gouge or round nose chisel.

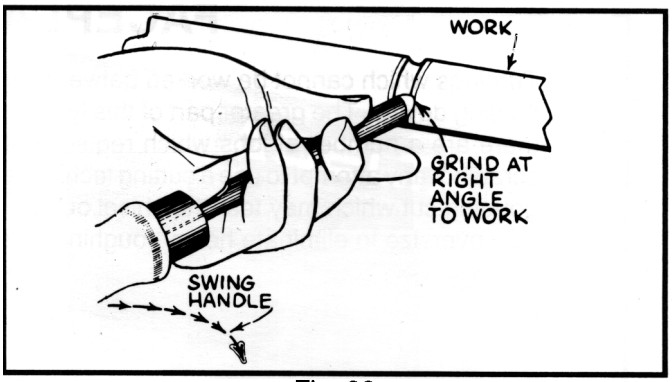


Fig. 82

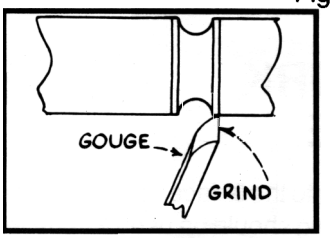


Fig. 83

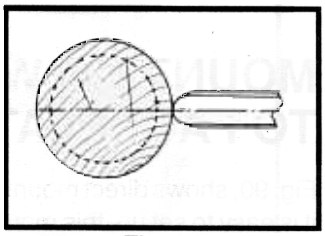


Fig. 84

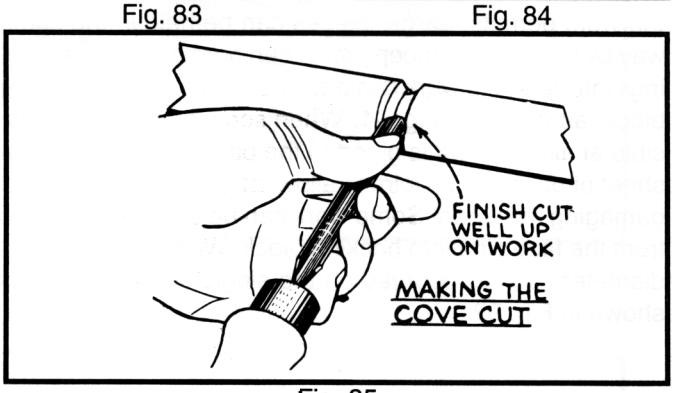


Fig. 85

SQUARE SECTIONS

When the turning has a square section, the stock should be jointed before turning. Good centering is essential since any error will show at the shoulder where the round meets the square. Turning of the shoulder from square to round can be done in various ways, one method being pictured in Figs. 86, 87, 88 and 89. If the parting tool is sharp, the nicking cut with skew, Fig. 86, can be omitted. The final trimming operation, Fig. 88, can be done with either the skew or spear chisels. This is a scraping operation. While the shoulder can be cut with the same technique used for cutting a bead, the simpler scraping method pictured does clean work and is easier to do.

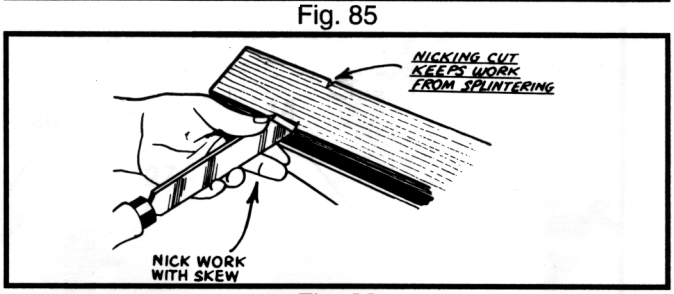


Fig. 86

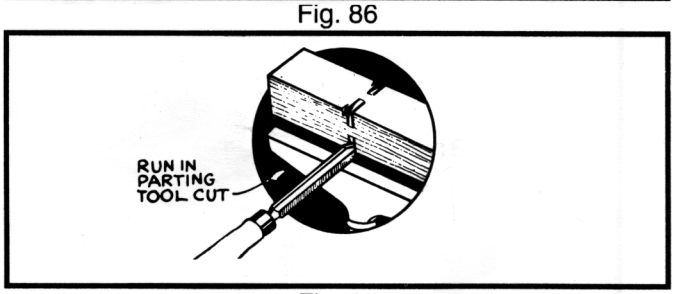


Fig. 87

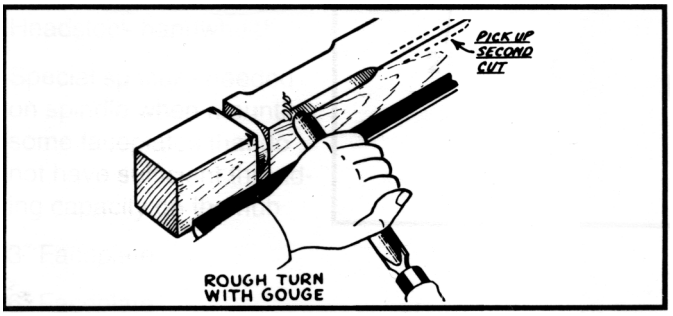


Fig. 88

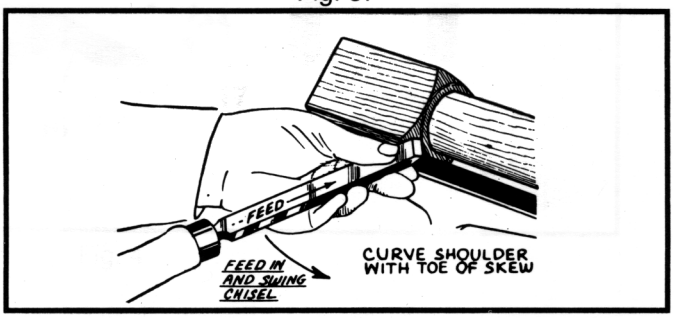


Fig. 89

FACEPLATE TURNING

Turnings which cannot be worked between centers must be mounted on a faceplate or other work-holding device. The greater part of this type of turning is done with the faceplate mounting, although there are a number of jobs which require special chucks. All cutting in faceplate work is done by scraping; any attempt to use a cutting technique on the edge grain of large work will result in a hogging, gouging cut which may tear the chisel out of your hands. All work should be roughly band sawed a little oversize to eliminate heavy roughing cuts in turning.

MOUNTING WORK TO FACEPLATE

Fig. 90, shows direct mounting to the 3″ faceplate. Because it is easy to set up, this mounting should be used whenever the work permits. Larger pieces can be held in the same way by using the 6″ faceplate. When normal screw-fastenings interfere, the work can often be mounted on a backing block, as shown in Fig. 91. When screws are not permissible at all, the work is glued to the backing block, fitting a sheet of paper at the joint to allow later separation without damaging the wood. Some work can be screwed or nailed from the face side into backing block. Work less than 3″ in diameter can be mounted on the single screw center, as shown in Fig. 92.

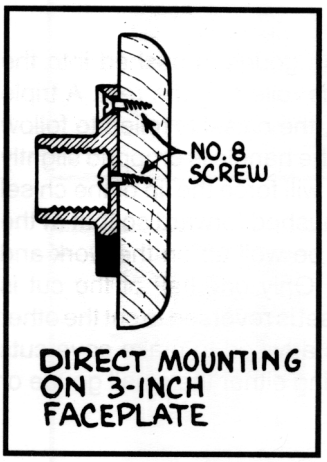


Fig. 90

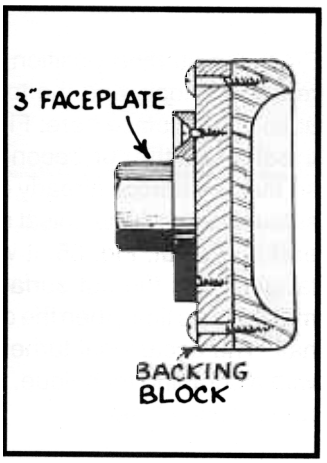


Fig. 91

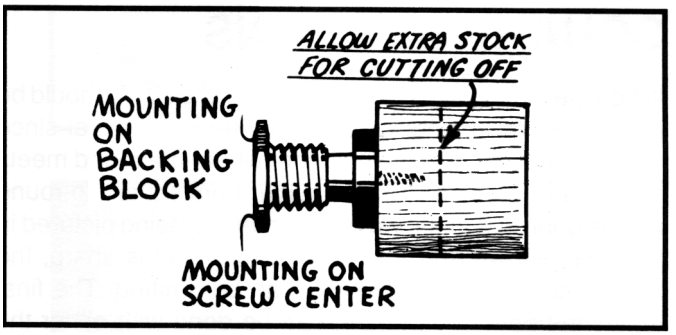
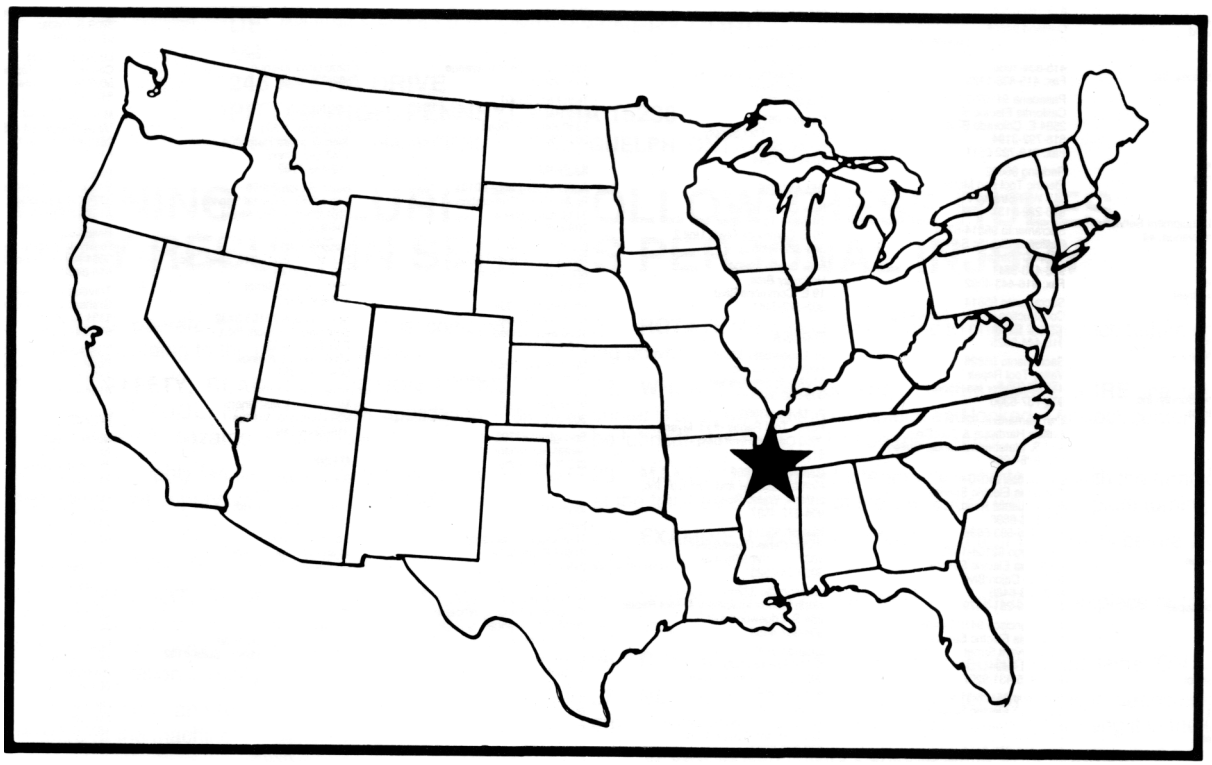


Fig. 92

DELTA

PARTS, SERVICE OR WARRANTY ASSISTANCE

All Delta Machines and accessories are manufactured to high quality standards and are serviced by a network of factory service centers and authorized service stations listed in your owner's manual. To obtain additional information regarding your Delta quality product or to obtain parts, service or warranty assistance, please call or fax Delta's toll-free 'hotline' number.



Delta maintains a modern, efficient Parts Distribution Center, maintaining an inventory of over 15,000 parts located in Memphis, Tennessee.

Highly qualified and experienced Customer Service Representatives are standing by to assist you on weekdays from 7:00 A.M. to 5:00 P.M. Memphis time.

MEMPHIS, TN 38118
4290 Raines Road
Phone: (901) 363-8800

HOTLINE
TELEPHONE: 800-223-7278

(FAX: 800-535-6488)

AUTHORIZED SERVICE STATIONS

In order to promote tool safety, Delta International Machinery Corp. strictly enforces the policy of repairing or replacing any damaged or missing standard safety equipment on machines presented to Delta Authorized Service Centers for service/repairs. Any product which is presented to a Delta Authorized Service Center for repairs which contains missing or damaged standard safety equipment will have that equipment repaired or replaced and the customer will be charged for any such service/repairs. Customers can avoid such charges only if the missing safety component is supplied to the service center at the time of repair.

ALABAMA

Birmingham 35208
Alabama Jack Co., Inc.
1140 5th Avenue North
205-251-8156

Hueytown 35023
Owens Power Tool Service, Inc.
700 Brooklane
205-942-6325

Montgomery 36121
Nor Wood Industries, Inc.
581-A George Todd Drive
205-260-9663

Mobile 36693
Southern Power Tool
3956 Government Blvd.
205-666-3623

ALASKA

Anchorage 99503
Alaska Tool & Equip. Service
3207 Arctic Boulevard
907-562-6151

Fairbanks 99706
Fairbanks Aero Services, Inc.
Box 60590
907-479-6666

ARIZONA

Glendale 83501
Banner Tool Service
6741 N. 57th Avenue
602-842-0800

Mesa 85204
East Valley Tool & Equipment Service
835 East Southern Avenue, #4
602-892-6163

Peoria 85345
Banner Tool Service
8240 W. Jefferson Street
602-486-1629

Phoenix 85014
Glenn's Tool Service
4036 North 13th Way
602-264-6203

Tucson 85711
Tool & Construction Supply, Inc.
4857 East 29th Street
602-745-1100

Tucson 85719
Western Tool Inc.
702 So. Campbell
602-884-0504

ARKANSAS

Ft. Smith 72901
Tool Service Co.
4420 Wheeler Avenue
501-648-3125

Jonesboro 72401
Don's Electric Tool Repair
1801 Parker Rd.
501-931-4634

Little Rock 72202
Electric Tool Service
1419 West 10th Street
501-374-8180

Russellville 72801
C & C Machinery Inc.
2120 E. 2nd Street
501-968-7144

Springdale 72765
Layman's Hardware & Supply Inc.
505 E. Emma Ave.
501-750-9967

CALIFORNIA

Burbank 91504
Rodman & Company
2823 N. San Fernando Road
818-846-9494

City of Industry 91745
Porter-Cable Corporation
1305 John Reed Court
818-333-3566

Concord 94520-5679
California Electric Service
1170-G Burnett Avenue
415-827-1011
Fax: 415-827-5409

Covina 91723-3536
California Electric Service
612 S. Shoppers Lane
818-915-4935
Fax: 818-339-6505

Dublin 94568-2611
California Electric Service
6759 Sierra Court, Suite B
415-551-3390
Fax: 415-551-3392

Eureka 95501
Electric Tool Co.
2810 Park St.
707-442-4267

Fontana 92335
California Electric Service
9744 Sierra Avenue
909-355-2500

Fresno 93703
R & R Machinery & Electric Inc.
1919 E. Home Avenue
209-233-1213

Fullerton 92631
California Electric Service Center
1208 E. Ash Avenue
714-870-0900

Huntington Beach 92649
Modern Tool Service
15561 Product Lane Unit D-6
714-898-3425

Los Alamitos 90720-3958
California Electric Service
11284 Los Alamitos Blvd.
213-430-2668
Fax: 213-598-8726

Los Angeles 92203
Minit Tool Company
3026 E. Olympic
213-264-7006

Mission Viejo 92691-3128
California Electric Service
23725 Via Fabricante, Unit B
714-586-9440
Fax: 714-586-9514

Modesto 95351
Stanislaus Electric Mtr. Works
504 River Road
209-523-8269

National City 92050
Natl. Tool & Machy. Repair, Inc.
241 W. 35th St. STE D
619-422-8665

North Hollywood 91605
Bucknall Power Tool Service
11910 Vose Street
818-765-0228

Oakland 94606
California Electric Service, Inc.
1143 E. 12th Street
415-834-1050
Fax: 415-836-1125

Pasadena 91107-3785
California Electric Servcice
2594 E. Colorado Blvd.
818-792-3194
Fax: 818-792-0511

Redding 96002
Electric Tool and Motor
915 Wall Street #1
916-222-1131

Sacramento 95814-6784
California Electric Service
1821 "Q" Street
916-443-5711
Fax: 916-443-4092

Sacramento 95814
Construction Industry Service Co.
1211 C Street
916-444-2525

Sacramento 95826
Valley Tool Repair
4131 B. Power Inn Road
916-737-6300

San Bernardino 92408
Battels Hardware & Tool Co.
433 S. Waterman Avenue, Suite H
909-888-1284

San Carlos 94070-4168
California Electric Service
990 Industrial Road, Suite 102
415-593-6696
Fax: 415-593-6698

San Diego 92104-1593
California Electric Service
3430 El Cajon Blvd.
619-283-6488
Fax: 619-281-3479

San Francisco 94103-4488
California Electric Service
1090 Bryant Street
415-431-8494
Fax: 415-431-9207

San Jose 95126-3154
California Electric Service
783 The Alameda
408-295-1722
Fax: 408-295-8451

San Leandro 94577
Porter-Cable Corporation
3039 Teagarden Street
P.O. Box 1913
510-357-9762

San Marcos 92069
Pro-Tek Tool Repair
215 Pacific Street, #111
619-471-4800

Santa Ana 92707-2850
California Electric Service
2025 S. Main Street
714-641-0529
Fax: 714-641-2947

Santa Barbara 93101
Buena Tool Co.
433 Laguna Street
805-963-3885

Santa Rosa 95401
Acme Electric Tool Repair
742 Wilson Street
707-546-5862

Santa Rosa 95403
H & V Tool Repair
1808 Empire Industrial Court #D
707-528-1111

Simi Valley 93063
Simi Tool Repair
2512 Tapo Street
805-584-8138

Temecula 92390-5623
California Electric Service
41715 Enterprise Circle North
909-695-5445

Torrence 90502
Universal Tool Service
21804 S. Vermont Avenue
310-328-6472

Van Nuys 91411-1018
California Electric Service
14753 Oxnard Street
818-997-8855
Fax: 818-997-3047

Whittier 90602
Battels Hardware & Tool Co.
13238 E. Whittier Blvd.
310-698-3714

W. Los Angeles 90064-2110
California Electric Service
2314 S. Westwood Blvd.
213-475-2532
Fax: 213-475-2844

COLORADO

Avon 81620
Tool Clinic
41000 Highway 6
303-949-6282

Colorado Springs 80219
Schlosser Tool and Machinery
3960 Sinton Road
719-636-1311

Denver 80204
Porter-Cable Corporation
2561 West 8th Ave.
303-892-6113

Denver 80219
*Schlosser Tool & Machinery
301 Bryant Street
303-922-8244

Grand Junction 81501
Professional Tool Service, Inc.
2420 E. Main
303-245-3158

CONNECTICUT

Hartford 06106
Utility Electric Service, Inc.
53 Main Street
203-246-7271

Oakville 06779
Watertown Tool Supply
28 Main Street
203-596-1344

DELAWARE

New Castle 19720
Tri-State Tool Repair, Inc.
19 E. Commons Blvd., Unit 2
302-322-9966

New Castle 19804
Holloway Bros.
19 E. Commons Blvd.
302-322-5441

FLORIDA

Ft. Lauderdale 33334
Master Repair Inc.
4107 N.E. 6th Avenue
305-566-5833

Ft. Myers 33905
Power Tool Repair of Ft. Myers
9950 Orange River Blvd.
813-694-6058

Gainesville 32609
Florida Fastener and Tool Co., Inc.
2826 N. Waldo Road
904-377-4587

Hialeah 33014
Porter-Cable Corporation
16373-75 NW 57th Ave.
305-624-2523

Jacksonville 32205
North Florida Machinery & Tool Repair
284 S. Edgewood Ave.
904-387-4455

Orlando 32806
S-Tek Power Tools, Inc.
3434 South Orange Avenue
407-851-5642

Orlando 32807
Florida Electro Mechanical Inc.
429C Gaston Foster Road
407-282-5367

Pensacola 32505
L.C. Electric Motor Service
117 Industrial Blvd.
904-476-7655

Riviera Beach 33404
3706 E. Industrial Way
407-848-4320

Tampa 33609
Porter-Cable Corporation
4538 W. Kennedy Blvd.
813-877-9585

West Palm Beach 33413
Reliable Tool Service Inc.
6533 Southern Blvd., Bldg #3, Bay #3
407-689-1676

GEORGIA

Augusta 30901
Tool Service Center
Box No. 1488
302 Walton Way
404-742-4803

Conyers 30207
Bucks Machinery Co.
1299 Norton Road, N.E.
404-483-7190

Morrow 30260
Porter-Cable Corporation
1286C Citizens Parkway
404-961-0900

Savannah 31402
Morgan's
110 Ann Street
912-234-2271

HAWAII

Hilo 96720
Hawaii Planing Mill Ltd.
380 Kanoelehua Avenue
808-935-0875

Honolulu 96819
A.L. Kilgo Co., Inc.
180 Sand Island Road
808-832-2200

Honolulu 96819
Slim's Power Tools, Inc.
1626 Republican Street
808-841-0902

Honolulu 96817
The Solaray Corporation
345 N. Nimitz Hwy.
808-523-0711

Kahului 96732
Maui Power Tool Service
251-H2 Lalo Street
808-877-3440

Wailuku 96793
Slim's Power Tools, Inc.
864 Alua Street
808-242-7878

IDAHO

Boise 83705
Air Equipment Company
2350 South Orchard Street
208-342-2464

Boise 83706
K.C. Supply Co.
5103 Irving Street
208-375-1313

Coeur de'Alene 83814
Coeur de'Alene Tool
451 Cherry Lane & Hwy 95
208-667-1158

Idaho Falls 83403
Rossiters Electric Motor
1501 South Capital Avenue
208-529-3665

Twin Falls 83301
Ellis Repair
2380 Kimberly Road
208-734-4400

ILLINOIS

Addison (Chicago) 60101
Porter-Cable Corporation
311 Laura Drive
708-628-6100

Lombard 60148
*Berlands House of Tools
600 Oak Creek Drive
708-620-0026

Mt. Vernon 62864
Holz Tool Supply
1306 Salem Road
618-242-4676

North Pekin 61554
Central Tool & Equipment
Div. A & I Supply
97 Highway Blvd.
309-382-2400

Springfield 62702
James Machinery
223 N. MacArthur
217-522-9115

INDIANA

Elkhart 46516
Thunander Corporation
21861 Protecta Dr.
219-295-4131

Evansville 47710
Brown & Hubert
(Division of Lensing Wholesale)
306 N. 7th Avenue
812-425-9049

Evansville 47711
Tri State Repair Service
1327 N. Fares
812-464-9341
607-729-5287

Fort Wayne 46808
Merrick Evans Inc.
2116 W. Coliseum Blvd.
219-482-4822

Goshen 46526
C & L Electric Motor Repair
1402 Chicago Avenue
219-533-2643

Indianapolis 46241
Macco Equip. Co., Inc.
3129 Kentucky Avenue
317-248-1444

Topeka 46571
Scarlett Machinery of Indiana
8035 W. 400S
219-593-2319

Warsaw 46580
Warsaw Tool Supply
113 W. Market St.
219-269-2999

IOWA

Cedar Rapids 52404
Puckett Tool & Fastener
410 1st Avenue NW
319-363-2211

Des Moines 50309
Puckett Electric Tools, Inc.
841 11th Street
515-244-4189

Hiawatha 52233
Janda's Tool Center
754 N. Center Point Road
319-393-4740

Iowa City 52240
Contractor's Tool
1430 Waterfront Drive
319-338-1121

KANSAS

Dodge City 67801-0179
Southwind Supply
1601 W. Frontview
316-225-4384

Manhattan 66502-9602
J & H Mowers & More Inc.
1616 Recreation Drive
913-537-4199

Overland Park 66214
*Overland Tool
9119 Barton
913-599-4044

Salina 67401
Mid Kansas Tool Repair
314 W. Cloud
913-825-6287

Wichita 67213
Richmond Electric Co.
911 Maple
316-264-2344

KENTUCKY

Bowling Green 42103
Hudson Tool & Equip. Ctr.
915-D Lovers Lane
502-781-6999

Lexington 40505
Kwik-Set Fasteners, Inc.
1151 Commercial Drive
606-252-7518

Louisville 40206
Bargain Supply Company
844 E. Jefferson Street
502-582-6651

Louisville 40217
Tool Repair Service
1200 Goss Avenue
502-635-6888

LOUISIANA

Alexandria 71301
John W. Ward Hardware
1743 Lee Street
318-442-7702

Baton Rouge 70806
Baton Rouge Rental Service
5101 Government Street
504-924-2959

Metairie 70011
R.J. Marchand Cont'r. Spec., Inc.
P.O. Box 8148
3515 Division Street
504-888-2922

New Orleans 70153-3432
Beerman Precision, Inc.
P.O. Box 53432
4206 Howard Avenue
504-486-9391

Shreveport 71101
McClamroch Machinery
939 Louisiana Avenue
318-222-9249

MAINE

Bangor 04401
N.H. Bragg & Son
Box 927, 92 Perry Rd.
207-947-8611

Portland 04104
M and W Tool Service
38 Portland Street
207-772-2057

MARYLAND

Baltimore 21201
Porter-Cable Corporation
7397 Washington Blvd., Suite #102
410-799-9394
Fax: 410-799-9398

Baltimore 21201
*Skarie, Inc.
707 N. Howard St.
410-728-6000

Baltimore 21237
State Saw & Machinery
8220-22 Pulaski Highway
410-686-7300

Cumberland 21502
Allegheny Motor & Pump Service
150 Wineow Street
301-777-0340

Delmar 21875
Atlantic Motor Service
8972 By-State Blvd.
410-896-3732

Kensington 20895
Space Electronic & Mechanic
10710 Vaughn Street
301-949-2922

Westminster 21157
Summers Service Co.
R2469 Sykesville Road
410-876-3216

MASSACHUSETTS

Fall River 02721
Burns, Inc.
350 M.S. Bishop Blvd.
617-675-0381

Franklin 02038
Porter-Cable Corporation
101-E Constitution Blvd.
508-520-8802
Fax: 508-528-8089

Springfield 01105
Saw Center
472 Main Street
413-734-2045

MICHIGAN

Alpena 49707
Alpena Electric Motor Service
M-32 West, Box 565
517-354-8780

Charlotte 48813
Johnson's Workbench
563 E. Cochran
517-543-2727

Escanaba 49829
Bosk Tool Service
918 North Lincoln Road
906-789-1112

Gaylord 49735
Graham Motor & Generator Service
977 N. Center
517-732-5005

Gladwin 48624
*Tool Haus
630 N. Silver Leaf
517-426-4549

Grand Rapids 49501
Monitor Machinery Co.
315 Commerce S.W.
616-458-1890

Grand Rapids 49504-3458
1184 Wilson Ave., N.W.
616-791-4760

Kalamazoo 49001
Kalamazoo Electric Motor Service
658 E. Vine Street
616-345-7802

Kingsford 49801
Northern Tool & Supply, Inc.
1021 Pyle Drive
906-774-3991

Lansing 48910
Denstaedts Hardware
3709 S. Cedar
517-882-4971

Ludington 49431
Carrier Electric Motor Repair Inc.
5608 W. 6th Street
616-845-5097

Muskegon 49444
*Atlas Equipment & Supply
2652 Wood Street
616-733-1814

Petoskey 49770
Ed's Electric Appliance Service
3924 Charlevoix Rd.
616-347-9599

Riverside 49084
Riverside Electric Service
3864 Riverside Road
616-849-1222

Traverse City 49684
Graham Motor & Generator Service Inc.
1131 Hastings
616-947-5824

Troy 48083
Porter Cable Corporation
1355 Combermere
810-597-5000

MINNESOTA

Duluth 55802
Acme Electric Co.
701 Mike Colalillo Drive
218-628-1027

Minneapolis 55429
Porter-Cable Corporation
4315 68th Avenue North
612-561-9080

MISSISSIPPI

Hattiesburg 39401
The Tool Center
5071 Highway 42
601-544-4536

Hattiesburg 39404
Mitchell Power Tool Service
2000 Byron Street
601-264-3308

Jackson 39202
Flannigan Electric Co., Inc.
1820 S. West Street Ext.
601-354-2756

MISSOURI

North Kansas City 64116
Porter-Cable Corporation
1141 Swift Avenue
P.O. Box 12393
816-221-2070

St. Louis 63119
Porter-Cable Corporation
7574 Watson Road
314-968-8950

Springfield 65802
Middle Earth Tool Repair, Inc.
306 No. National
417-831-0954

MONTANA

Billings 59101
Allen's Electric Tool Repair
115 5th Street, W.
406-248-3865

Black Eagle 59414
Mosch Electric Motors
2513 17th Street North East
406-453-2481

Bozeman 59715
*Owenhouse Hardware
36 E. Main
406-587-5401

Missoula 59801
City Electric
Electro Service Center Div.
101 S. Catlin Street
406-549-4115

Missoula 59801
Montana Tool Co.
1908 North Ave. West
406-721-6425

Whitefish 59937
Northwest Tool Repair
6466 Highway 93 South
406-862-6275

NEBRASKA

Lincoln 68504
Lincoln Tool Service Center
3535 North 40th Street
402-464-1157

Lincoln 68521
Tool Hospital
1720 Adams Street
402-435-2996

*IND. MACHINERY SERVICE

Omaha 68127
Thacker Electric
8507 I Street
402-592-9433
NAT WATS 800-678-7604

Omaha 68127
Tool Hospital
4630 So. 85 Street
492-592-5220

NEVADA

Las Vegas 89103
E & M Industrial Hardware
3725 West Russell Rd.
702-736-6102

Las Vegas 89109
Tool Service, Inc.
3229 Industrial Road
702-734-9161

Las Vegas 89118
Service Select Power Tool Repair
5720-A S. Valleyview Blvd.
702-739-1939

Las Vegas 89119
A-1 Equipment & Tool Repair
2520 E. Sunset Road
702-261-9680

Sparks 89434
Sierra Supply, Inc.
1830 E. Lincoln Way
702-353-3333

NEW HAMPSHIRE

Brentwood 03833
Brentwood Machine Sales Inc.
Building #313 - Rte #125
603-679-8452

Keene 03431
Hamshaw Lumber
3 Bradco Street
603-352-6506

Nashua 03061
Hammar Industrial
175 Amherst St.
P.O. Box 1209
603-882-5161

NEW JERSEY

Roselle 07203
Tool & Machinery Service, Inc.
419 East 1st Avenue

Somerville 08876
Butensky Services Co.
10 County Line Road, Suite 7
908-707-0912

NEW MEXICO

Albuquerque 87107
Martin Saw and Tool
3421 Vassar N.C.
505-888-1675

Farmington 87401
Western Tool Crib
2601 East Main
505-325-4543

NEW YORK

Albany 12202
R. B. Wing & Son Corp.
460 South Pearl Street
518-563-4161

Albany 12206
Albany Burner Control, Inc.
20 Colvin Avenue
518-459-8856

Amherst 14226
*Philipps Bros. Supply Inc.
2525 Kensington Avenue
716-839-4800

Buffalo 14210
S & S Electric Repair Shop Inc.
2470 Seneca Street
716-823-1232

Commack 11725
*County Power Tool Service, Inc.
237 Commack Rd.
516-499-5666

Flushing 11365
Porter-Cable Corporation
175-25 Horace Harding Expwy.
718-225-2040

Glens Falls 12801
J.E. Sawyer
64-90 Glen Street
518-793-4104

Hunter 12442
Windham Equipment
Rt. 296 & 23 C
Beaches Corners
518-263-4577

Kingston 12401
Miron Bldg. Products, Inc.
C.P.O. Box 1598
Rt. #9W North
914-336-6000

Peekskill 10566
Peekskill Electric Motor
13 South Broad St.
914-737-4141

Port Chester 10573
Pelham Tool Co.
21 Abendrough Avenue
914-937-1771

Rochester 14608
Jackson Saw & Knife Co.
517 State Street
716-546-7485

Rochester 14608
O. G. Schwarz, Division of Hanes Supply, Inc.
430 Atlantic Avenue
716-482-9282

Southampton 11968
Richards Tool and Motor Repair
County Road 39 & N. Main Street
516-283-5130

Syracuse 13210
Syracuse Industrial Sales
713 E. Fayette Street
315-478-5751

Uniondale 11553
*Enterprise Machinery Co., Inc.
825 Nassau Road
516-485-2804

Utica 13502
McQuade and Bannigan
1300 Stark Street
315-724-7119

Vestal 13850
Cascade Electric Inc.
416 Commerce Rd.
607-729-5278

Watertown 13601
McQuade & Bannigan
124 Murroch Circle
315-788-2612

NORTH CAROLINA

Burlington 27215
Paynes Power Tool
2550 S. Mebane Street
910-227-1031

Charlotte 28209
Porter-Cable Corporation
4303B South Boulevard
704-525-4410

Greensboro 27405
Tool & Equipment Supply, Inc.
807 Huffman Street
919-275-6124

Jacksonville 28540
Tool Repair & Sharpening Service
413 Marine Blvd.
910-455-3437

Raleigh 27604
Specialty Tool Service of Raleigh Inc.
2420 Atlantic Ave.
919-833-5903

Wilmington 28405
M.F. McLean Enterprises
Rt. 6, Box 97
Old Wrightsville Road
910-343-1775

Winston Salem 27106
Piedmont Power Mach. Srv. Inc.
4305J Enterprise Drive
910-759-2022

NORTH DAKOTA

Bismark 58501
Acme Electric Motor, Inc.
1009 Basin Avenue
701-258-1267

Dickinson 58601
Fix It Shop
316 21st Street East
701-225-0766

Fargo 58103
Acme Electric Motor, Inc.
920 36th St., S.W.
701-235-8060

Grand Forks 58201
Acme Electric Motor, Inc.
1705 13th Avenue North
701-746-6481

Minot 58701
Acme Electric Motor, Inc.
525 20th Avenue S.E.
701-839-2263

OHIO

Barberton 44203
Viking Akron Tool & Supply Co.
2915 New Park Drive
1-800-362-0585
216-753-1063

Cincinnati 45210
Cincinnati Electric Repair
2023 Elm St.
513-621-2183

Cincinnati 45215
Pro Tool Service Inc.
1125 Glendale-Milford Road
513-772-1490

Columbus 43212
*Columbus Hardware
944 W. 5th Avenue
614-294-8665

Columbus 43214
Porter-Cable ACorporation
4560 Indianola Avenue
614-263-0929

Alpha (Dayton) 45301
Authorized Tool Service Co.
676 Orchard Lane
P.O. Box 5
513-429-5593

Hartville 44632
Hartville True Value
940 W. Maple Street
216-877-3631

Holland 43528
Power Tool Sales & Service
6713 Angola Road
419-868-8665

Lima 45801
Lima Armature Works
142 E. Pearl St.
419-222-4010

North Canton 44720
N. Canton Repair Shop
1555 No. Main
216-499-3529

Toledo 43606
Power Tool Sales & Service
2934 Douglas Road
419-473-0962

Toledo 43613
Electric Tool & Equipment
3156 Upton Avenue
419-474-7537

Valley View 44125
Porter-Cable Corporation
Sweet Valley Business Park
Unit #18
216-447-9030

West Milton 45383
Conken Equipment Co.
4950 Frederick Garland Road
513-698-3363

Youngstown 44515
Stambaugh Thompson
3754 Henricks Road
216-792-9071

OKLAHOMA

Enid 73701
Enid Electric Motor
1406 N. 4th
405-234-8622

Oklahoma City 73109
Steve's Wholesale
2423 S. Walker
405-631-0352

Oklahoma City 73126
Whitton Supply Co.
1419 W. Reno
405-236-5561

Tulsa 74101
Wesche Company
P.O. Box 217
2005 East 7th Place
918-583-7551

Tulsa 74115
Steve's Wholesale Dist., Inc.
5342 E. Admiral Place
918-834-0991

OREGON

Eugene 97402
Jim's Tool Service
515 Wilson Street
503-344-1243
Fax: 503-344-1513
Toll Free: 1-800-327-2033

Grants Pass 97526
Machine Masters
508 N.E. "F" Street
503-479-8876

Klamath Falls 97601
Quality Tool Repair
836 Richmond Street
503-883-5870

Medford 97501
Precision Power Tool Repair Inc.
2919 N. Pacific Highway
503-770-5541

Portland 97202
Professional Power Tool Repair Inc.
2506 S.E. 8th Ave.
503-234-3734

Portland 97212
Continental Machine & Tool Inc.
51 N.E. Hancock
503-288-6888

Redmond 97756
Dave's Tool Repair
2392-5 S. Highway 97
503-548-0510

PENNSYLVANIA

Allentown 18103
Curio Electric Repair
825 South 5th
215-432-9923

Bellefonte 16823
*Triangle Bldg. Supply & Services
1076 E. Bishop St.
814-355-5885

Erie 16510
Erie Power Tool Service
2920 Buffalo Road
814-899-6419

Harrisburg 17109
Stationary Equipment Sales & Service
P.O. Box 10242
Rear 3605 Ridgeway Rd.
717-545-8043

Kingston 18704
Total Services & Systems, Inc.
166 W. Union Street
717-287-2121

Lancaster 17601
Woodworker's World, Inc.
1509 Lititz Pike
717-299-5264

Monroeville 15146
Professional Tool Service
700 Seco Road
Monroeville Industrial Park
412-373-7440

Philadelphia 19107-2375
Ideal Tool & Equipment Service
140 N. 10th Street
215-925-0672

Philadelphia 19154
Porter-Cable Corporation
12285 McNulty Road
215-677-7800
Fax: 215-677-9908

Slatington 18080
Doward's Electric
4711 Main Street
215-767-8148

Williamsport 17701
*Hermance Machine
First & Campbell Street
717-326-9156

York 17402
General Tool & Repair, Inc.
2449 S. Queen St.
717-741-9592

SOUTH CAROLINA

Columbia 29203
Mann Electric Repair Co.
3600 Main Street
803-252-7777

Greenville 29609
Tool Shed
901 Pointsett Highway
803-233-6185

Mt. Pleasant 29464
Royall Ace Hardware
884 Ben Sawyer Blvd.
803-884-2551

Myrtle Beach 29577
Coastal Elec. & Rewinding
718 8th Avenue N.
803-448-3586

Spartanburg 29302
Cash Supply
113 Country Club Rd.
803-585-9326

SOUTH DAKOTA

Rapid City 57702
Stan Houston Equipment Co.
1210 Deadwood Avenue
605-348-1155

Sioux Falls 57702
Stan Houston Equip. Co.
501 S. Marion Road
605-336-3727

TENNESSEE

Chattanooga 37412
F & D Tool Service and Supply
4121 Ringgold Road
615-698-6454

Jackson 38301
Smith Tool Service
908 S. Highland Avenue
901-427-4012

Jamestown 38556
Kirby's Fix-It
P.O. Box 147
120 N. Norris
615-879-7414

Knoxville 37914
Adrian Machine Tools
2900 Thorn Grove Pike
615-522-9991

Knoxville 37918
Automated Controls Technology, Inc.
4821 N. Broadway
615-688-3574

Memphis 38115
Bird Fasteners, Inc.
6920 Winchester Rd., #102
901-366-1748

Nashville 37210
Allied Tool Repair
1005 Second Ave. S.
615-242-8026

Nashville 37210
Power Tool Service of Nashville, Inc.
1106 Elm Hill Pike
Suite #130
615-255-8227

TEXAS

Abilene 79604
Abilene Lumber Co., Inc.
2025 Industrial Blvd.

Amarillo 79107
Tascosa Tool Service
306 N. Fillmore
806-373-3474

Austin 78722
Hamilton Electric Works Inc.
3800 Airport Blvd.
512-472-2428

Austin 78758-5498
The Tool Box
9906A Gray Boulevard
512-836-5483

Corpus Christi 78405
Corpus Christi Power Tool & Repair
3701 Agnes
512-883-1117

Corpus Christi 78405
Otto Dukes Machinery Co.
2588 Morgan Street
512-883-0921

Dallas 75220
Air & Electric Tool Co.
2326 Myrtle Springs
214-869-3277

Dallas 75220
Porter-Cable Corporation
10720 N. Stemmons Freeway
214-353-2996

El Paso 79902
Schlosser Tool & Machinery
1505 Wyoming
915-544-8665

El Paso 79905
C.L. North Co.
123 Chelsea Street
914-772-1469

Ft. Worth 76110
Air & Electric Tool Co., Inc.
3301 South Grove
817-921-0231

Houston 77008
*Circle Saw Builders Supply
2510 Ella Boulevard
713-864-8444

Houston 77055
Porter-Cable Corporation
West 10 Business Center
1008 Wirt Road
Suite 120
713-682-0334

Longview 75606
Eastex Welding
Box 3223
1232 W. Marshall
214-758-7327

Lubbock 79405
Lubbock Electric Co.
1108 34th Street
806-744-2336

Lubbock 79412
Caprock Equipment Service & Supply
2112 50th St.
806-747-9177

Lufkin 75901
Maddux Building Materials
1603 Atkinson Drive
409-634-3369

McAllen 78501
Weslaco Tool
700 Ash Street
210-664-9156

Midland 79701
Midland Tool Specialty
918 S. Main Street
915-682-4647

Odessa 79761
Builder's Tool & Fasteners
713 E. 2nd Street
915-332-3511

San Angelo 76903
Frank's Electric
2621 Martin Luther King
915-655-8928

San Antonio 78205
Electric Motor Service
1514 E. Commerce
512-226-3462

San Antonio 78212
*Otto Dukes Machinery
600 San Pedro
210-224-5576

Sherman 75090
Texoma Tool Repair Co.
309 E. Houston Street
214-892-1510

Texarkana 75501
Ray's Electric Motor Repair
922 Bowie Street
214-792-7031

Tyler 75702
Mason Machinery
1908 W. Erwin Street
214-592-6581

Waco 76710
Gross Yowell
3720 Franklin Drive
817-754-5425

Weslaco 78596
Weslaco Tool Co.
1221 West Expressway 83
210-968-9156

Wichita Falls 76301
Hornsby Heavy Hardware
615 Ohio Street
817-322-8696

UTAH

Logan 84321
Tool Liquidator
839 N. Main
801-753-4256

Salt Lake City 84115
A.C. Tool and Service, Inc.
2990 South West Temple
801-487-4953

Salt Lake City 84115
*M & M Tool and Machinery
1773 S 300 W (Rear)
801-485-8200

Salt Lake City 84115
Schlosser Tool and Machinery
2199 S. West Temple
801-484-4242

VERMONT

S. Burlington 05403
Burlington Tool Repair
23 San Remo Drive
802-658-4131

VIRGINIA

Christiansburg 24073
SPC United/Warren E. Smith Shops
820 JK Park St.
703-382-5501

Fredericksburg 22404
Fredericksburg Hardware Co., Inc.
513 William Street
703-373-8383

Harrisonburg 22801
Rocking R Hardware
1030 S. High Street
703-434-9967

Norfolk 23517
Bryan Electric Co., Inc.
424 West 25th Street
804-625-0378

Norfolk 23502
*Henry Walke Co.
1161 Ingleside Road
804-855-1071

Penn Laird 22846
JL Lawn & Garden Center
Route 1, Box 183
703-289-9844

Richmond 23222
Staley Co., Inc.
2024 Chamberlayne Avenue
804-321-6595

Roanoke 24013
Roanoke Armature Co.
1108-1/2 Street S.E.
703-345-8741

WASHINGTON

Bellevue 98005
*Eastside Saw & Sales
12880 Bel Red Road
206-454-7627

Bellingham 98225
Pro Tool of Bellingham
300 Ohio Street
206-733-7343

Fife 98424
Tap Power Tool Service
1421 52nd Avenue East
206-922-5787

Port Angeles 98362
L & L Tools
1927 E. First St.
206-457-1116

Renton 98055
Porter-Cable Corporation
268 Southwest 43rd Street
206-251-6680

Spokane 99202
Spokane Power Tool
E. 801 Trent Avenue
509-489-4202

Yakima 98901
Cooper Electric Motor Service
205 S. 4th Avenue
509-452-9550

WEST VIRGINIA

Huntington 25701
Lawter Electric Motor Co.
202 Adams Avenue
304-522-8297

Wheeling 26003
Kennedy Hardware
3300 McCulloch Street
304-233-3600

WISCONSIN

Green Bay 54301
Power Tool Service Co.
310 N. Webster Ave.
P.O. Box 1343
414-437-2594

Green Bay 54304
*Bay Verte Machinery
1023 Ashwaubenon
414-336-7440

Kenosha 53144
Aetna Power Tool Service
(Div. of Aetna Mfg. Co.)
4622 - 68th Avenue
414-654-1170

LaCrosse 54603
A-Line Machine Tool Co.
800 Monitor St.
608-785-1515

Madison 53713
Electric Motors Unlimited
1000 Jonathan Drive
608-271-2311

Milwaukee 53222
Wisconsin Power Tool Inc.
10700 Burleigh Street
414-774-3650

Oshkosh 54901
*Kitz & Pfeil Hardware
427 North Main
414-236-3340

Schofield 54476
R.A. Miller Industrial Supply
303 Ross Avenue
715-355-7999

WYOMING

Casper 82601
Casper Saw Shop
147 S. McKinley
307-237-3279

WASHINGTON, D.C.

Advanced Tool & Machine Service (ATMS)
1933 Montana Avenue, N.E.
206-636-8670

PUERTO RICO

Aquadilla 00603
J.C.A. Enterprises, Inc.
PR 111 South, Bldg. 531
BO. Victoria
P.O. Box 3879
809-891-1741

San Juan 00922
*Ferreteria Abraham Inc.
P.O. Box 11974
Caparra Hts. Sta.
809-782-6033

Sierra Bayamon 00961
B & M Electric Tool Repair Center
Calle 49, Bloque 51
Casa 27 Avenue West Main
809-787-2287

CANADA

Alberta

Calgary T2E 8L2
Bay #6, 2520-23 St. N.E.
403-735-6166

British Columbia

Burnaby V5A 4T8
8520 Baxter Place
604-420-0102

Manitoba

Winnipeg R3H 0H2
1699 Dublin Avenue
204-633-9259

Ontario

Mississauga L4V 1J2
6463 Northam Drive
416-677-5330

Guelph N1H 6M7
644 Imperial Road
519-836-2840

Ottawa K2A 3X2
851 Richmond Road
613-728-1124

Quebec

St. Laurent (Mtl), P.Q.
H4R 1V8
1447, Bégin
514-336-8772

Ste. Foy G1N 4L5
Suite 202
2202 Rue Lavoisier
418-681-7305

DELTA

Two Year Limited Warranty

Delta Machinery

Delta will repair or replace, at its expense and at its option, any Delta machine, machine part, or machine accessory which in normal use has proven to be defective in workmanship or material, provided that the customer notifies his supplying distributor of the alleged defect within two years from the date of delivery to him, of the product and provides Delta Machinery with reasonable opportunity to verify the defect by inspection. Delta Machinery may require that electric motors be returned prepaid to the supplying distributor or authorized service center for inspection and repair or replacement. Delta Machinery will not be responsible for any asserted defect which has resulted from misuse, abuse or repair or alteration made or specifically authorized by anyone other than an authorized Delta service facility or representative. Under no circumstances will Delta Machinery be liable for incidental or consequential damages resulting from defective products. This warranty is Delta Machinery's sole warranty and sets forth the customer's exclusive remedy, with respect to defective products; all other warranties, express or implied, whether of merchantability, fitness for purpose, or otherwise, are expressly disclaimed by Delta.